Protohistoric Cultures of the Tungabhadra Valley

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M.S. Nagaraja Rao

PROTOHISTORIC CULTURES
OF
THE TUNGABHADRA VALLEY

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by

M. S. NAGARAJA RAO
Director General
Archaeological Survey of India
New Delhi

WITH CONTRIBUTIONS
by
Dr. K. R. Alur Dr. Vishnu Mittre

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To
My Father
Late MIRLE SRINIVASA RAO

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KRISHNA POTADAR, SHRICO, MALAMADDI, DHARWAR-7

PREFACE

Karnataka is an ancient land where great empires such as those of the Chalukyas, the Rashtrakutas, the Hoysalas and Vijayanagar rose and prospered. Many great religions flourished here from very early times. Man's ingenuity and ability to make human beings rich and comfortable both materially and spiritually are amply evidenced in this land by great souls.

Karnataka is an archaeologist's paradise. Particularly so is the north Karnataka region, which incidentally is the Karnatak University area. ' No other area in India holds a similar promise of a better harvest to the investigator of prehistoric cultures '. Archaeological studies in this region, however, are still in their infancy. A few sites have been excavated and attempts are being made to reconstruct the various stages through which man has traversed in his journey from savagery to civilization. More research in this direction is a necessary desideratum. From this point of view, laudable effort has been made by Dr. Nagaraja Rao. Karnatak University has associated itself with a few excavations and will in future take up independent projects.

Excavations are easily conducted, but it is necessary to publish the results for the benefit of scholars and students. It is gratifying to note that not only Hallur was excavated, but the interesting findings are being placed at the disposal of everyone interested. I hope the work published by Dr. Rao will be studied by scholars and research students. My blessings are with the excavator-author Dr. Nagaraja Rao in his venture.

A. S. Adke

(A. S. ADKE)
Vice-Chancellor

KARNATAK UNIVERSITY
DHARWAR-3
13th March, 1971

Photographic illustrations by

SHRI R. S. DESAI
Artist, Kannada Research Institute
Karnatak University, Dharwar-3

FOREWORD

When Robert Bruce Foote first described the Neolithic remains he had discovered in profusion in Bellary and neighbouring districts he can little have foreseen the extraordinary interest which excavation at such places might reveal. In the past twenty years a series of exciting excavations have taken place, at Brahmagiri, Sangankal, Piklihal, Maski, etc., and each one has added new data to build up the emerging picture. Dr. Nagaraja Rao's work at Hallur is a worthy addition to all these. Not only did it extend the known distribution of the Neolithic culture into the southernmost parts of Dharwar district, but it also revealed a new kind of riverside settlement, in contrast to the hill settlements upon which attention had so far been focussed in this region. Another most important aspect of the excavation is that it revealed a continuous occupation in a single section, passing through several phases of Neolithic-Chalcolithic culture into the opening centuries of the early Iron Age. Among the many striking discoveries we need only mention three : the radio-carbon dating of the introduction of iron at Hallur to the very beginning of the first millennium B.C., if not before ; the discovery of equine remains during the final phase of the preceding period (suggestively pointing towards the arrival of new elements of population from far to the north ; and the discovery of Ragi (Eleusine coracana), proving that this grain was already used as a foodstuff during the second millennium B.C. The value of the report is enhanced by the excellent studies of animal and plant remains.

It is one of the paradoxes of archaeological research that each new discovery opens up new prospects for fresh work. There is a clear need for the discovery of new sites, the further excavation of sites already broached, and for the continuing application of new research techniques. The Karnataka offers a wonderful scope for the archaeologist, and we look forward to Dr. Nagaraja Rao's continuing his researches there.

(F. R. ALLCHIN)

CHURCHILL COLLEGE, CAMBRIDGE
12*th September*, 1968

AUTHOR'S NOTE

The small scale excavations at Hallur conducted in 1965, revealed a continuous sequence of occupation during the protohistoric period. Radio-carbon determinations for the site have shown that this period extended from about B.C. 1800 to the Early Historic period. Combined with the results of the investigations at Tekkalakota (Nagaraja Rao, M. S. and Malhotra, K. C., 1965) and Sanganakallu (Ansari, Z. D. and Nagaraja Rao, M. S., 1969), the excavations at Hallur have provided a definite proof of the different cultural periods in the Tungabhadra valley during the protohistoric period. A clear picture of the life of the neolithic inhabitants of the valley has emerged. At present, we know that the iron-using people arrived in the valley sometime in the beginning of the first millennium B.C., if not before, and coexisted with the neolithic-chalcolithic people. Further work, we hope, will certainly throw more light on the pattern of life in the Iron Age and the succeeding periods.

Though the report on Hallur excavations was completed by the middle of 1966, the publication was delayed due to unavoidable circumstances. This, however, causes no regret, as I was able to discuss the results with distinguished scholars in England. This in turn has helped to present the results in a better perspective.

Although the neolithic character of the site of Hallur was recognised by me as early as 1962, it was not until I made a study of the Neolithic-Chalcolithic culture of Karnataka, that I realised the importance and the need for systematic excavations at this site. This was possible only during February-March of 1965. In carrying out these excavations and writing the report, I am indebted to various institutions and individuals. It is, therefore, with great pleasure that I record my deep debt of gratitude to all those who have made this a success.

The Director-General of Archaeology in India, New Delhi, and the Collector of Dharwar district, granted the necessary permission to carry out the excavations. I am thankful to both these authorities. Dr. H. D. Sankalia, Joint Director, Deccan College Research Institute, Poona, readily made the funds available for the project and it was under his general direction that the excavations were carried out. He also agreed to my suggestion to make the operations a joint project of the Kannada Research Institute, Karnatak University, Dharwar and the Deccan College. Dr. P. B. Desai, Director, Kannada Research Institute, gave his consent to this proposal and recommended to the authorities of the University my deputation to carry out the work. For this I am highly grateful both to Dr. Sankalia and Dr. P. B. Desai and to the authorities of the University.

At Hallur, I was ably assisted by my friend and former colleague, Sri. A. Sundara in the actual excavations. Sri. C. G. Padwal, an artist of the Deccan College, whose services were spared by Dr. Sankalia, prepared several necessary illustrations on the site itself. The local officials and some of the school teachers were of immense help to make our stay at Hallur very comfortable. To all these grateful thanks are due.

In the preparation of the report, I am indebted to various scholars. The presence of Dr. K. R. Alur in Dharwar is of great value to my studies. He had already examined the animal remains from Sanganakal, a contemporary neolithic site in Bellary district. He readily consented to study the animal bones and prepare a report on them. Similarly, Dr. Vishnu Mittre of Lucknow (who has already studied plant remains from a number of excavated sites in India) took great interest and sent his report on the charred and encrusted grains from Hallur well in advance. Further Sir Joseph B. Hutchinson of the School of Agriculture, Cambridge University, made valuable comments on the plant remains at Hallur. The studies of all these scholars have definitely enhanced the value of the report. The authorities of the Radiocarbon Laboratory of the Tata Institute of Fundamental Research, Bombay, processed the carbon samples and promptly notified the dates for the various periods and phases. Dr. M. S. Sadasiviah, Professor of Geology, Karnatak University, kindly examined the stone blade tools and provided the identification of the material. Prof. R. N. Desai, Department of Zoology, Karnatak College, Dharwar, readily helped me in identifying the shell remains. It is due to the helpful co-operation of all these scholars, I am now able to shape the report in the present form. I am extremely grateful to them all.

Shri B. B. Lal, Director-General of Archaeology in India, New Delhi, and Dr. R. V. Joshi, Prehistory Branch, Archaeological Survey of India, Nagpur, very kindly spared the services of Mr. Bashir Khan, Artist. This greatly facilitated the preparation of the final line illustrations. Mr. Khan worked incessantly for four weeks and completed the work. Mr. R. S. Desai, Photographer-Artist of the Kannada Research Institute, not only prepared the photographs and maps with great skill and interest but helped me in preparing the various plates. But for the friendly attitude and co-operation of these artists, the report would not have been complete. To both the artists my thanks are due. I offer my special thanks to Sri. B. B. Lal and Dr. R. V. Joshi for their co-operation.

In India the text of the report has been scrutinised by Dr. Sankalia. This and the valuable discussions I had with Drs. Raymond and Bridget Allchin helped me in revising the report. Dr. Raymond Allchin who is himself an authority on the Deccan Neolithic culture, had examined the excavated material at Dharwar. In Cambridge, he kindly spared time to go through the revised manuscript and made valuable suggestions. I am deeply indebted to him for his guidance and for writing the Foreword.

Finally, the text of the report has been neatly typed by my wife, Parimala, to whom my thanks are due.

M. S. Nagaraja Rao

(M. S. NAGARAJA RAO)

CHURCHILL COLLEGE
CAMBRIDGE U.K.
12*th September*, 1968

Postscript :

The publication of this report was further delayed due to inexplicable reasons. However, I am now glad to be able to present it to scholars and archaeologists. **I am specially grateful to Dr. A. S. Adke, B.E., M.I.E., Ph.D. (Engg.), Vice-Chancellor, and Shri S. S. Wodeyar, M.A., LL.B., Registrar, Karnatak University, Dharwar, for having permitted me to publish the report independently.** In addition, Dr. Adke found time to grace the report with his preface, in spite of his busy schedule, for which I am much obliged. Once again, all the help received from the University in this venture is gratefully acknowledged here.

As always, my two friends Shriyuts Krishna Potadar and R. S. Desai, took personal interest and saw that the book was printed in just forty-five days. Not only did Shri Potadar prepare the illustrative blocks and a very attractive jacket with great skill and precision, but made several trips to Bangalore to get the work completed. Stationed at Bangalore, Shri B. S. Achar of Ashwinee Kitarts contributed his own share in the production of this work. I am deeply beholden to all these friends for their interest and help.

Shri M. S. Chintamani of the Eastern Press, Bangalore, has managed to see the book through the press in as short a period as six weeks. The volume itself stands testimony to his personal attention and skill in printing the work. My grateful thanks are offered here for his prompt compliance.

M. S. Nagaraja Rao

YUGADI, VIRODHIKRUTU
27th March 1971

(M. S. NAGARAJA RAO)

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ABBREVIATIONS

AI	..	Ancient India
APAS	..	Andhra Pradesh Archaeological Series
BDCRI	..	Bulletin of the Deccan College Research Institute
BSOAS	..	Bulletin of the School of Oriental and African Studies
EC	..	Epigraphia Carnatica
IAR	..	Indian Archaeology—A Review
JASB	..	Journal of the Asiatic Society of Bombay
JIH	..	Journal of Indian History
JRAI	..	Journal of the Royal Anthropological Institute

INTRODUCTION

The study of the neolithic-chalcolithic cultures of the Deccan involved a reassessment of the results of the previous excavations in the light of fresh explorations and excavations. With this end in view, the author surveyed the river Tungabhadra from the southern tip of Dharwar district to the confluence of the river with the Krishna (between 1957 and 1964). From among the various sites explored, two new sites were selected for excavation. They were Tekkalakota in Bellary district and Hallur in Dharwar district. The purpose behind this selection was that it was long believed that the neolithic inhabitants of the Karnataka region always preferred to stay on the 'made grounds' upon the castellated granite hills, in the Chitradurga—Bellary—Raichur region and in the neighbouring districts of Andhra Pradesh. But explorations brought to light a number of mounds situated on the river banks yielding antiquities of this period. Hallur in the southern tip of Dharwar district is one such site and appeared to be an undisturbed mound. It was, therefore, thought that a comparison of the results of trial excavations of the sites on the granite hills of Tekkalakota and on the mound on the left bank of the Tungabhadra at Hallur, would throw fresh light on the ways of life of the neolithic folk of the region.

Tekkalakota presented very little difficulty, as the thickness of the deposit was found to be only about a metre and a half. Further, the excavated site was found to be inhabited only during the neolithic period. But Hallur presented a couple of problems and therefore, was a more interesting site.

During the surface explorations, the mound at Hallur yielded, besides the neolithic wares, a highly burnished, white-painted black-and-red ware. As pointed out elsewhere (Nagaraja Rao, M. S., 1964, pp. 76-77), the occurrence of this ware posed a problem. The fabric and shapes of vessels appeared to be typical of those of Iron Age graves whereas the tradition of painting in white was so far known only to a number of chalcolithic sites. Such white painted varieties of this ware were found as one of the main ceramics in the chalcolithic context in the sites such as Gilund and Ahar in Rajasthan, Nagda and Navdatoli in Central India, and Prakash and Tekwada in Maharashtra. Therefore, it was very important to know the stratigraphic position of this ware. For if it occurred in the

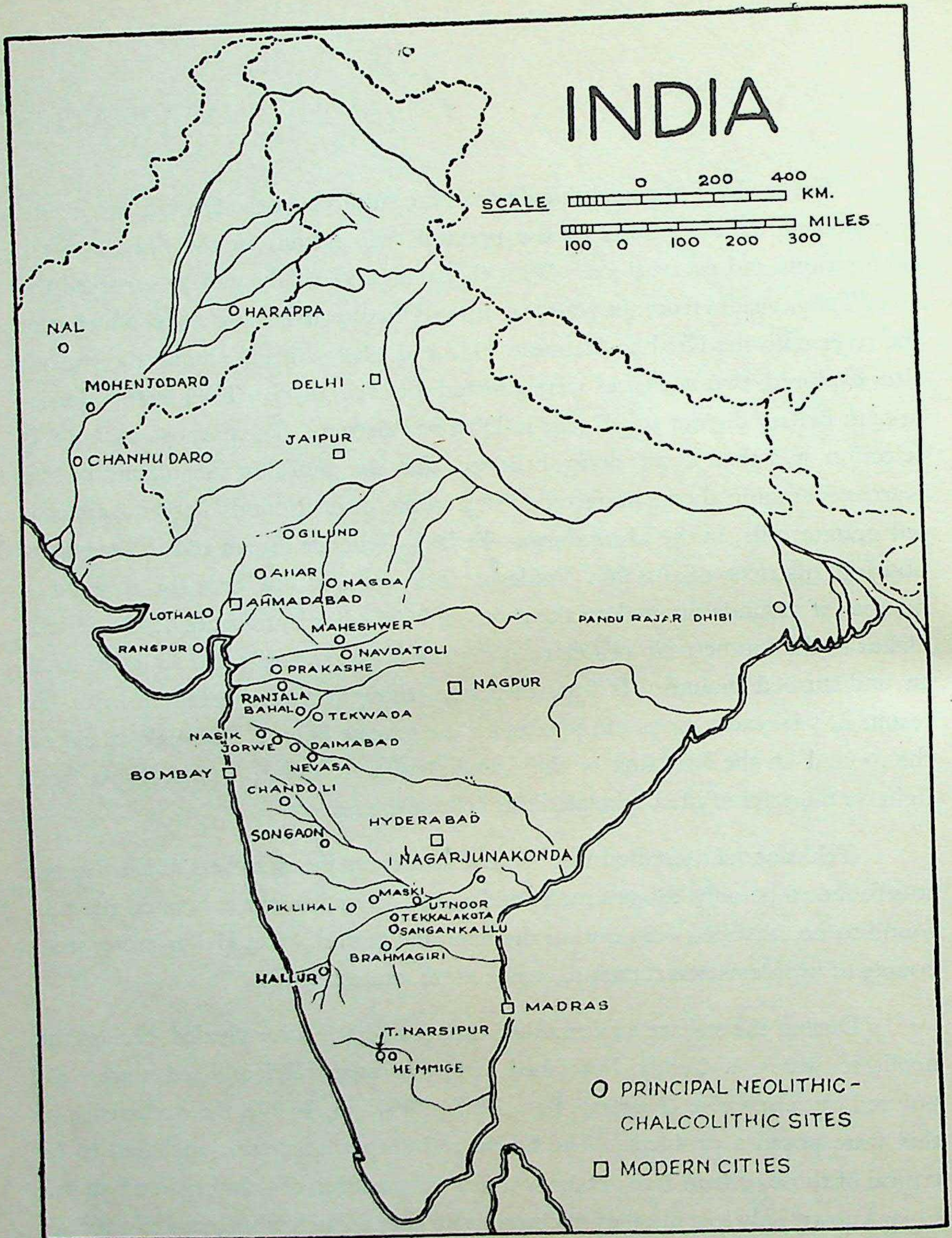
INDIA
SCALE
0 200 400 KM.
100 0 100 200 300 MILES
NAL
HARAPPA
MOHENJODARO
DELHI
JAIPUR
CHANHU DARO
GILUND
AHAR
NAGDA
AHMADABAD
LOTHAL
MAHESHWER
PANDU RAJAR DHIBI
RANGPUR
NAVDATOLI
PRAKASHE
NAGPUR
RANJALA
BAHAL
TEKWADA
NASIK
JORWE
DAIMABAD
NEVASA
BOMBAY
CHANDOLI
HYDERABAD
SONGAON
NAGARJUNAKONDA
MASKI
PIKLIHAL
UTNOOR
TEKKALAKOTA
SANGANKALLU
BRAHMAGIRI
HALLUR
MADRAS
T. NARSIPUR
HEMMIGE
O PRINCIPAL NEOLITHIC-CHALCOLITHIC SITES
□ MODERN CITIES

FIG. 1

neolithic-chalcolithic context in this site, it would prove to be a link between the chalcolithic phase of the Deccan and North Karnataka. If it was confined to the Iron Age phase, then that would be a new feature of the megalithic of the region.

Secondly, about the Iron Age culture itself, there has been some controversy regarding its chronology. The authors of the graves known as 'megaliths' are supposed to be the Iron Age folk. Some scholars ascribe the advent of these Iron Age people to about B.C. 300 (Wheeler, 1948, p. 201 and 1959, p. 163), whereas some others have suggested B.C. 700 or 1000 (Banerjee, 1961, p. 28 and 1965, p. 200). Here at Hallur, therefore, was a chance to fix absolutely the date of this much debated problem by a properly conducted excavation and carefully collected datable material.

The site was also expected to provide evidence regarding the inter-relationship between the neolithic-chalcolithic and the Iron Age cultures of Karnataka.

With these problems in view, it was decided to excavate on a small scale, at Tekkalakota and Hallur, in 1963. The excavation at the former site was taken up in November 1963. Since the site was very promising and yielded interesting results, the investigations there were continued till March 1964. The results have subsequently been published (Nagaraja Rao & Malhotra, 1965).

It was not until February 1965, that the excavations at Hallur could be started. The season of six weeks yielded results beyond our expectations. But it also posed many new problems, as any small scale excavation should do. These problems could be solved only when a large scale, horizontal excavation is undertaken at the site.

The results of the excavations of 1965 are reported in the following pages.

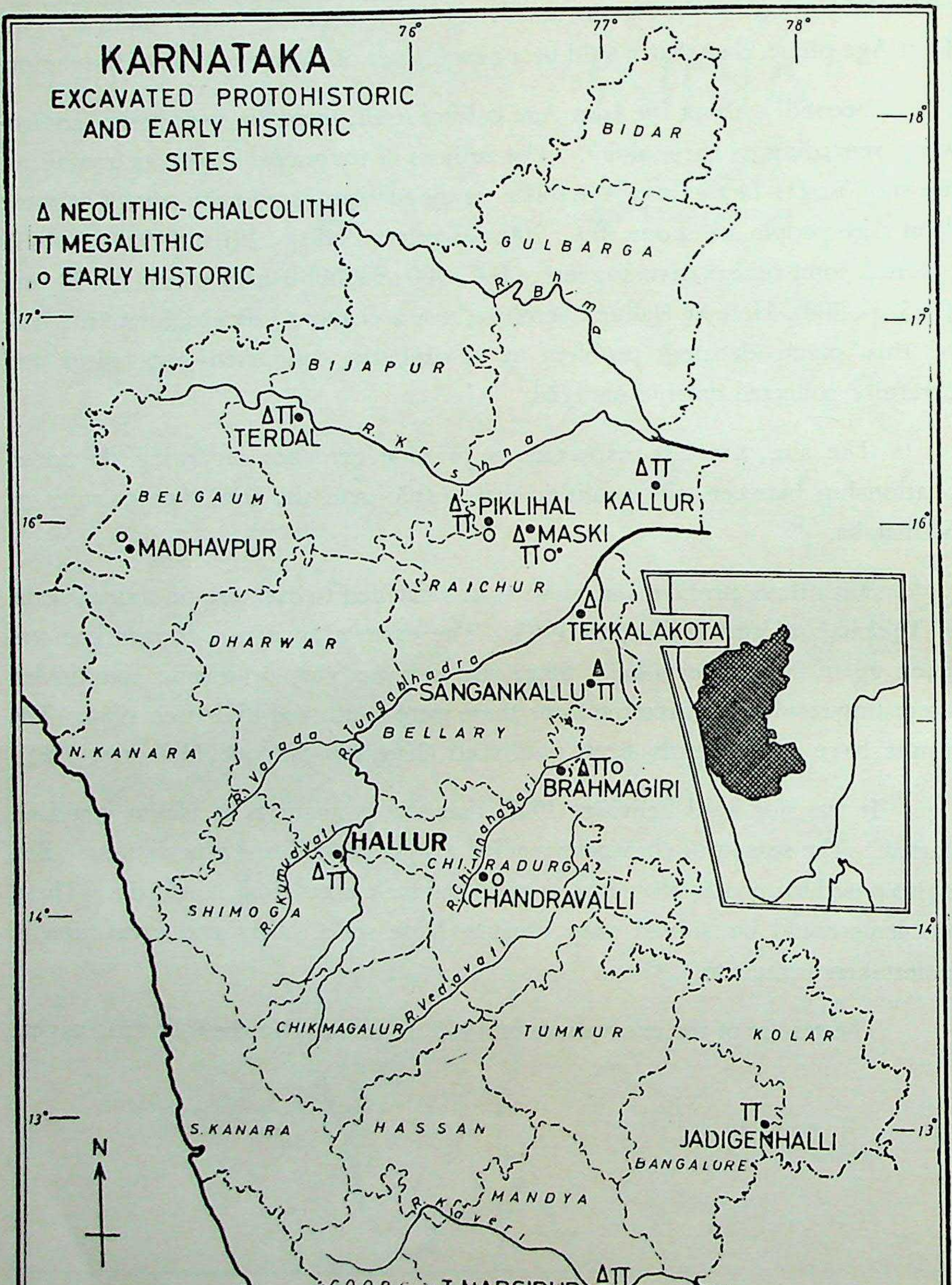
KARNATAKA
EXCAVATED PROTOHISTORIC AND EARLY HISTORIC SITES
Δ NEOLITHIC- CHALCOLITHIC
ΤΤ MEGALITHIC
o EARLY HISTORIC
76°
77°
78°
18°
17°
16°
14°
13°
12°
75°
BIDAR
GULBARGA
R. Bhima
BIJAPUR
TERDAL
R. Krishna
BELGAUM
MADHAVPUR
PIKLIHAL
KALLUR
MASKI
RAICHUR
TEKKALAKOTA
DHARWAR
R. Tungabhadra
SANGANKALLU
R. Varada
N. KANARA
BELLARY
BRAHMAGIRI
R. Chinnahagari
HALLUR
R. Kumudvati
CHITRADURGA
CHANDRAVALLI
SHIMOGA
R. Vedavati
CHIKMAGALUR
TUMKUR
KOLAR
JADIGENHALLI
S. KANARA
HASSAN
BANGALORE
MANDYA
R. Kaveri
COORG
T. NARSIPUR
HEMMIGE
MYSORE
N
0
50
100
KILOMETRES

FIG. 2

HALLUR AND ITS ENVIRONS

Hallur (14° 20′ N. Lat, 75° 37′ E. Long, 1″ Map 57 A/14) is a border village in the Hirekerur taluka of the Dharwar district, Mysore State. It is located on the left bank of the river Tungabhadra. The village is connected by bus from Honnali, a taluka place in the Shimoga district, about 7 miles south of Hallur. Honnali itself is approachable by bus from Harihar, a prominent railway station on the Poona-Bangalore Metre gauge section of the Southern Railway.

Historical Background

Hallur has long been identified with Hallavuru, Vijayasamudra or Vijayapura, said to be situated on the bank of the Tungabhadra, of the inscriptions (Rice, B. L., 1909, p. 48; see also, *EC.*, Vol. V, p. xxii, pp. 460 and 512; Vol. VII, HL. 26, 28 & 50; and Vol. XI, p. 15). It was the royal residence of the Sindas of Belagavarti, now called Belagutti, Feudatories of the Hoysalas (*EC*, Vol. XI, Dg. 43). Hoysala Ballala II (A.D. 1180–1220) often made this his wartime capital, during his military operations in this region (*EC*, Vol. V, pp. 460 and 512).[1]

The antiquity of the place, however, goes back to a very remote past. The stone implements recovered from the surface explorations, in the hilly tracts to the west of the village prove beyond doubt that palaeolithic man inhabited this region. Further explorations in the river valley will certainly bring to light more evidence regarding the existence of prehistoric man. The river Tungabhadra has already yielded fossil remains of prehistoric animals at Nittur, near Tekkalakota.[2] The mound to the north of the village has shown definite evidence of occupation during the Neolithic Age, Iron Age and the Early Historic period. During the historic period, the site, as already mentioned, was under the Sindas of Belagutti and the Hoysalas. The mud fort which stands on the ancient mound was probably constructed during the mediaeval period, by the later Muslim-Maratha chiefs.

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[1] A viragal of his time, found in Puradakeri, a mile north of Hallur, mentions that Ballala was ruling at Vijayasamudrapattana.

[2] Now in the Deccan College Museum, Poona (*IAR*, 1963-64, p. 24).

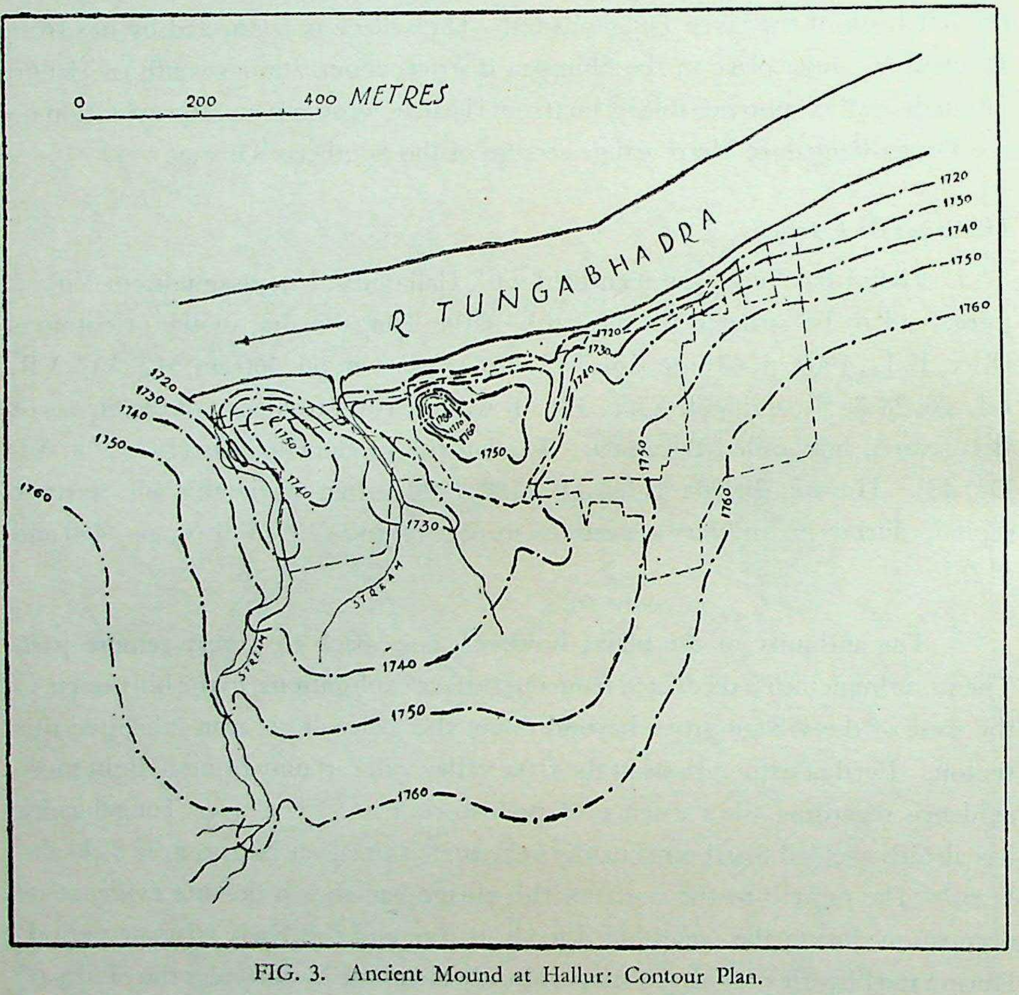
0
200
400 METRES
R TUNGABHADRA
1720
1730
1740
1750
1760
1770
STREAM
STREAM

FIG. 3. Ancient Mound at Hallur: Contour Plan.

Geological Features[1]

The region around Hallur, which is the meeting place of the Dharwar and Shimoga districts, is generally characterised by the archaean complex of rocks known by the general term 'the Dharwar complex'. Emerging from beneath the Deccan trap, this band, known as the Dharwar-Shimoga schist belt, traverses the area in south-southeast direction. It comprises chlorite schists and green stones with mica schists, quartzites, haematite quartzites and limestones. The lowest section of the 'Dharwars' in this schist belt comprises a series of volcanic rocks which are intruded by felsite, and quartz porphyry. Over these volcanic rocks occur thick beds of layered conglomerates intercalated with quartizite. Above these conglomerates are a thick series of quartzites, micaceous in character. The quartzites are overlain by argillitic schists, lime-stones and banded, ferruginous quartzites. These latter are intruded at some places by granite porphyry.

A number of trap dykes occur in the river Tungabhadra upstream. These seem to have provided the raw material for the stone axe industry at the site. Silicious materials are reported to be intrusions into the auriferous tract of the Shimoga belt, otherwise known as Honnali belt, near Honnali. The other important geological aspect of this region is the gold-bearing auriferous tract of this Honnali belt. The name Honnali itself means 'village of Gold'. Some gold mining activity went on in this part; but, since it was economically not profitable, mining was abandoned.

The surroundings of Hallur are characterised by featureless hills and haematites causing a sort of red soil. On the northern hilly slopes are a number of cist circles, which are made up of the locally available haematite boulders. The western region in the immediate vicinity shows exposed sections of schists, which were made use of by the early inhabitants to fashion their edge ground tools, and to prepare floor-beddings of schist chips.

The Ancient Mound (Pl. IA; Figs. 3-4)

The ancient mound is situated on the left bank of the river Tungabhadra, adjacent to the north of the present village Hallur. It was first noticed by the Kannada Research Institute, in 1948-49 (Panchamukhi, 1953, p. 21) and antiquities of early historic period were reported. The neolithic-chalcolithic nature of the site was noted by the author when he explored the site, as an official of the Archaeo-

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[1] Based on Rama Rao, B., 1962.

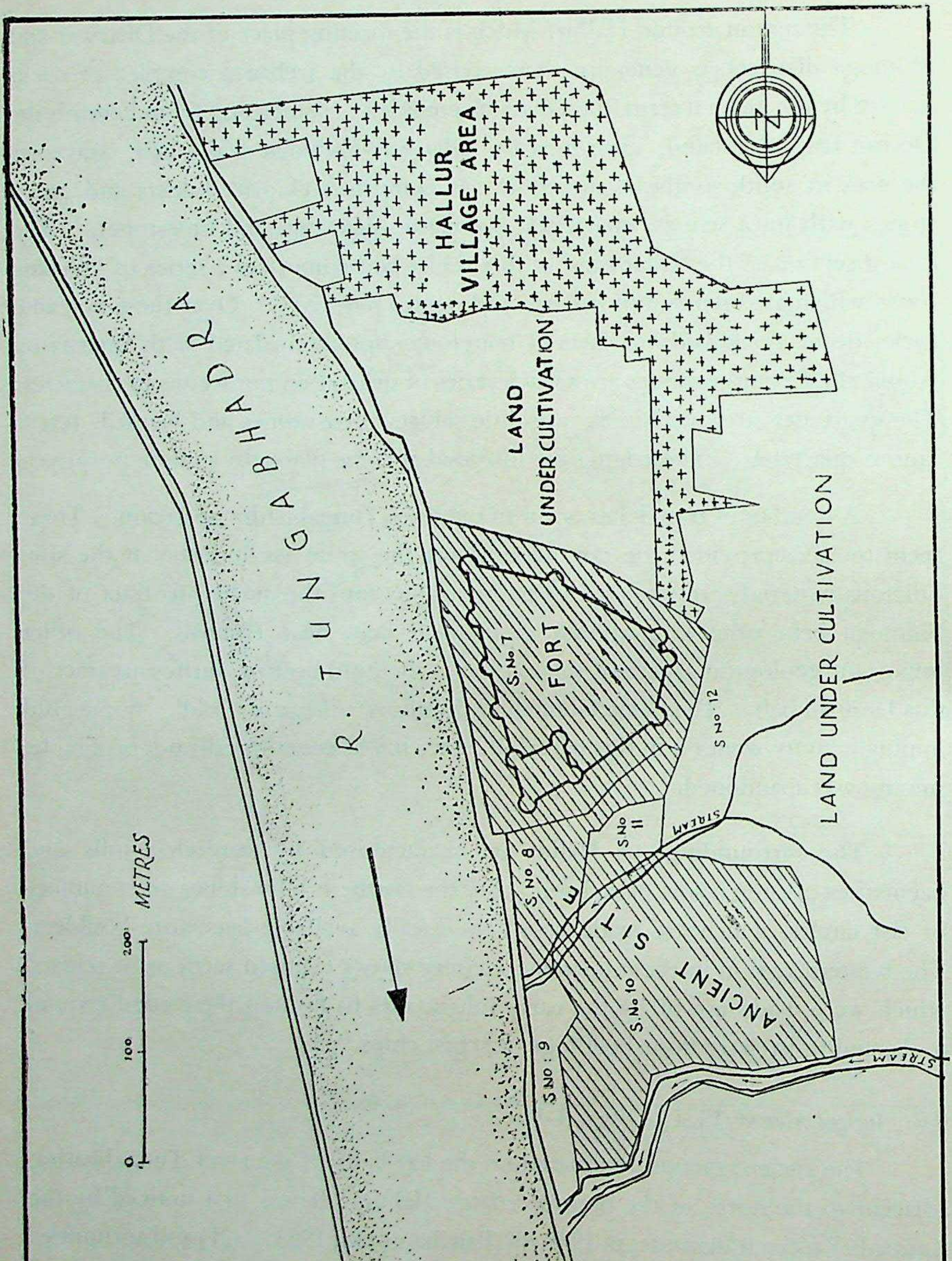
HALLUR
VILLAGE AREA
LAND
UNDER CULTIVATION
LAND UNDER CULTIVATION
R. TUNGABHADRA
FORT
S. No 7
S. No 8
S. No 9
S. No 10
S. No 11
S. No 12
ANCIENT SITE
STREAM
STREAM
N
0
100
200
METRES

FIG. 4. Site Plan of Ancient Mound at Hallur.

logical Survey of India (*IAR*, 1962-63, p.16; see also, Nagaraja Rao, 1964, pp. 59-65; 1964a, pp. 158-59). On the mound is a mediaeval mud fort, and a moat, cut around the fort, divides the mound into two parts. The fort on the southern part is surrounded by a mud wall, which is destroyed in most parts. and has eleven bastions. The north-eastern corner of the fort has the remains of a structure, probably a residential building (palace of the chiefs?), with four bastions, which include two of the original bastions of the fort wall. Remains of residential buildings are seen in the interior of the fort. Remains of a medieval temple are also found inside. The construction of this fort destroyed much of the earlier cultural deposits.

The northern part of the mound, beyond the moat, slopes towards the north and northwest. The upper deposit of this part also appears to be slightly disturbed by cultivation. But greater part of the deposit appeared to be intact, Hence excavations were undertaken in this part of the mound.

HALLUR TRENCH 1 : INDEX CHART OF ANTIQUITIES 1965

LAYER No.	POTTERY														STONE INDUSTRIES			METAL		CULTURAL PERIODS & PHASES
1													o	o						
2													o	o						
3											o	o	o	o						
4				o	o						o	o							o	II
5				o	o						o	o			o				o	
6				o	o						o	o			o				o	
7				o	o			o	o	o	o	o			o				o	I 2
8		o		o	o			o	o	o					o		o	o		
9		o	o	o	o			o	o	o					o		o	o		
10		o	o	o	o			o	o	o					o		o	o		
11		o	o	o	o			o	o	o					o		o	o		
12	o	o	o	o	o										o					1b
13	o	o	o	o	o	o	o								o	o				
14	o	o		o	o	o	o								o	o				1a(?)
	A1	A1 SR	A1 Perf.	A2	A2 Ptd.	A3	A3 Ptd.	A4	A5	AB	B1	B1 Ptd.	B3	B2 Ptd.	GROUND STONE AXES	STONE FLAKES	BLADE INDUSTRY	COPPER	IRON	

Note : For the sake of convenience Allchin's terminology (1960, p.xv) has been adopted in the chart.

EXPLANATIONS :

A1 — Pale grey. black & grey, unburnished
A1 SR — do surface roughened
A1 Perf — do perforated

A2 — Pale grey & black, burnished
A2 ptd — do with post-firing ochre paint

A3 — Red, brown or buff, turn-table made
A3 ptd — do with prefiring paintings in purple, black or violet

A4 — Blotchy grey, surface fused & burnished
A5 — Blotchy, brown-and-black

AB — Painted red ware akin to Jorwe Ware

B1 — Iron Age Black-and-red ware
B1 ptd — do White painted

B2 ptd — Russet coated painted ware
B3 — Early historic black-and-red ware

THE CULTURAL SEQUENCE AND MAIN CHARACTERISTICS

Excavations were conducted in the northern part of the main mound, bearing survey No. 8. Two trenches were dug: Tr. 1 up to the natural soil which was struck at a depth of 6.78 m.; and Tr. 2 at 4-20 m. Both the trenches exhibited similarity in the cultural contents except that in Tr. 1, the top 1.50 m. deposit was much disturbed by modern burials. Two main periods could be distinguished on the basis of pottery and other cultural elements. The following distinguishing features were observed. The correlation chart of layers from Trs. 1 and 2 shows the equation of layers and the cultural phases.

Correlation Chart of Layers

		Tr. 1 Layers	Tr. 2 Layers	Cultural Periods
Disturbance		1, 2 3	1 (Humus)	Contains Early historic Pottery
Period II		4 5 6 7	2 3 4 5	Overlap of Chalcolithic & Early Iron Age cultures
Period I	Phase 2	8 9 10 11	6 7 8 9	Neolithic–Chalcolithic
	Phase 1	12 13 14	10 11	Early-Neolithic

Period I

Period I may be designated neolithic for reasons explained elsewhere (Nagaraja Rao, M. S. & Malhotra, 1965, p. 3). It consists of layers 8 to 14 in Tr. 1 and 6 to 11 in Tr. 2 and the thickness of the deposit is 3.50 m. in Tr. 1 and 2.70 m. in Tr. 2 respectively.

This period may further be subdivided into two phases, on the basis of ceramic and other peculiarities exhibited. However, the index chart of pottery wares and other antiquities suggests that the earliest layer, 14 of Tr. 1 might almost be classed as a separate phase. But for the present the original classification of phases has been adhered to as only a large-scale excavation at the site can confirm the existence of an earlier phase.

Phase 1, represented by layers 12, 13 and 14, in Tr. 1 and 10 and 11 in Tr. 2, is characterised by the pale grey and burnished wares—sometimes painted with red ochre, a coarse blackish grey, and a very small quantity of reddish brown ware with pre-firing purple painting similar to the A3 painted wares of Piklihal (Allchin, 1960, pp. 56-58). Further, the typical neolithic stone blade industry is conspicuous by its absence, as also is any knowledge of metal. The polished stone tools are rare, even the few found had been no more than edge-ground being made on suitably formed pieces of the locally available schist slabs, a very bad material for tool manufacture. The other noteworthy features are the absence of any floors and the rarity of other antiquities such as beads, etc. For these reasons, this phase may be called early neolithic.

Phase 2 is represented by layers 8, 9, 10 and 11 in Tr. 1, and 6, 7, 8 and 9 in Tr. 2. The chief features of this phase are the change in the ceramic traditions, occurrence of specialised types of copper implements, a profuse blade industry—both of which are significant, and a general increase in the quantity of antiquities.

The pottery fabrics which distinguish this phase are (i) black-burnished ware which continues from phase 1; (ii) brown-and-black ware, which is the major ware of the phase; (iii) coarse dull red ware—all the three with the ochre painted variety; and (iv) a sparsely represented painted black-on-red ware akin to the 'Jorwe fabric'. Pale grey ware which marks the phase 1 is conspicuous by its absence.

As far as the neolithic polished stone axe industry is concerned, there is an increase in the number of tools, and dolerite and trap are used in the manufacture of the tools and not the soft schist which was used in Phase 1. The rich blade industry suddenly makes its appearance. But the material used is black quartzite. The types of tools consist of parallel-sided blades, lunates, etc., typical of the contemporary sites in the Deccan. Copper also appears for the first time, making the phase chalcolithic in character, and double-edged axes, fish-hooks, etc., are found. A large number of bone tools, shell and steatite beads, and other objects occur.

The other distinguishing feature is the occurrence of structural remains and a number of floors, made up of chips of locally available schist. Another important feature is the evidence of urn burials, similar to those found at Tekkalakota, Nevasa, Daimabad and Chandoli. With these distinguishing features this phase may be designated neolithic chalcolithic.

Period II

This period is represented by layers 4, 5 and 6 in Tr. 1, and 2, 3, 4 and 5 in Tr. 2. The period represents an overlap of the neolithic-chalcolithic and early Iron Age cultures. Whereas the characteristic features of the phase 2 of period I—except the blade industry[1]—continue, the Iron Age cultural traits are distinguished by the typical black-and-red ware, all black-wares—both with a white painted variety, a red slipped ware; and iron implements consisting of arrowheads, spearheads and knife blades. The burials of Iron Age—the megaliths-comprised cairns and dolmenoid cist-circles are found to the west of the site and to the north on the slopes of hilly tracts.

In Trench 1, the top disturbed deposit of about 1.50 m., yielded a mixed quantity of antiquities consisting of the russet-coated painted ware, red slipped ware, black ware and black-and-red ware, typical of the early historic period, testifying to the fact that the site was occupied during that period.

Comparative Chronology

It has been explained in detail elsewhere (Nagaraja Rao & Malhotra, 1965, pp. 10-11) that it may not be correct to correlate the sequence of cultures of all the excavated neolithic sites in the region, because almost all the excavations have been of limited nature and the culture at each of these sites is not fully identical and of uniform pattern of evolution. But there is a general similarity, only so far as stone working traditions and certain pottery fabrics are concerned. A comparative chronology for Hallur is postulated here taking into consideration only the general similarity in pottery fabrics and the comparable phases already dated by Radio-carbon method. But again, the usual practice of giving a correlation chart, equating the various cultural phases of the different sites has been deliberately eschewed.

As already described, two periods have been distinguished at this site. Period I is further divided into two phases on the basis of ceramic evidence and the presence or absence of metal and blade tools. The neolithic sites in Karnataka which are so far dated by Radio-carbon method are Tekkalakota, Sangankal, T. Narsipur, Terdal and Kodekal. Utnur in Andhra Pradesh is another (Allchin, 1961, p. 63).

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[1] Probably due to the advent of iron.

On the basis of comparative evidence, phase 2 of period I at Hallur may be equated with Tekkalakota, phases 1 and 2. Phase 1 of Tekkalakota appears to represent a late phase of phase 1 or the early part of phase 2 of Hallur. Because, although pale grey ware is the main ceramic of the phases at both the sites, the typical stone blade industry and the metal, copper, are absent at Hallur in the earliest phase, as noted in both the excavated trenches. It is, therefore, postulated that phase 1 at Hallur is earlier than phase 1 at Tekkalakota. So far 5 dates are available for Tekkalakota (Agrawal *et al.*, 1965, p. 397). The date suggested for a sample from the lowest layer is B.C. 1615 ± 105 (Nagaraja Rao & Malhotra, 1965, p. xii). Thus phase 2 of Hallur may tentatively be ascribed to circa B.C. 1500. Then phase 1 would be much earlier and period II later.

On the basis of this evidence, the following tentative chronology may be postulated for Hallur Cultural sequence:

PERIOD I		
	Phase 1	circa B.C. 1800—1500
	Phase 2	circa B.C. 1500—1100
PERIOD II		circa B.C. 1100—800

Absolute Chronology

Carbon samples from all the phases have been sent to the Tata Institute of Fundamental Research, Bombay, for Radio-carbon determinations. So far six dates have been received, one for phase 1, three for phase 2 of period I and two for period II. More dates are awaited. The dates available are as follows:

HALLUR, *Mysore*

TF. 573 Overlap Phase. 2820 ± 100 (2905 ± 100)
Charcoal from Trench 1, Depth 2.35–3.55 m., Layer 5,
Sample No. 4, 1965. Comment: Sample belongs to Megalithic-Neolithic phase. Sample submitted by M. S. Nagaraja Rao, Karnatak University.

TF. 570 Overlap Phase. 2970 ± 105 (3055 ± 105)
Charcoal from Trench 1, Depth 1.80–2.10 m., Layer 4,
Sample No. 1, 1965. Comment: Sample belongs to Megalithic–Neolithic overlap phase.[1]

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[1] Reproduced from *C*-14 *Dates—May* 1966, cyclostyled Bulletin received from the Secretary, Radiocarbon Dating Committee, TIFR, Bombay. Each sample has been given two dates in years before present; the first one is based on the half-life value of 5568 ± 38 years; within the parenthesis is given the second date based on the half-life value of 5730 ± 40 years. To convert the dates to A.D./B.C. years, 1950 should be used as the reference year (Godwin, 1962).

TF. 580 Neolithic Period. 3560 ± 105 (3660 ± 105)
Charcoal from Trench 1, Layer 14,
Depth 6.1–6.4 m. Sample No. 11, Field
No. HLR/1965. Submitted by M. S. Nagaraja Rao, Karnatak University, Dharwar. Comment: Sample belongs to an early level.

TF. 575 Neolithic Period. 2895 ± 100 (2980 ± 105)
Charcoal from Trench 1, Layer 7,
Depth 3.2 m. Sample No. 6, Field No. HLR/1965.
Submitted by M. S. Nagaraja Rao
Comment: (M.S.N.): Sample derives from the latest neolithic phase just prior to the arrival of megalithic people.[1]

TF. 576 Neolithic Culture. 3280 ± 105 (3375 ± 110)
Charcoal from Trench 1, Layer 8, Depth 3.6 m., Field No. HLR/1965.

TF. 586 Neolithic Culture 3145 ± 100 (1195 B.C.)
Charcoal from Trench 2, pit sealed by Layer 8, Depth 2.8 m. NaOH pretreatment was also given.
(*IAR*, 1967-68, p.71).

Thus the date for the earliest occupational phase of the site is circa B.C. 1710 ± 105 and for period II, i.e., the early Iron Age, the dates are circa B.C. 1105 ± 105 and 955 ± 100. It is thus evident that the chronology postulated by us for period I, phase 1 and for period II is confirmed by the Radio-carbon dates. It is, therefore, expected that the other dates ascribed to period I, phase 2 would also be confirmed. This gains further corroboration when we know that the neolithic levels at T. Narsipur which has yielded similar cultural contents, as at Hallur phases 1 and 2, is dated to circa B.C. 1805 ± 110 ± 1495 ± 110, by carbon 14 method.[2]

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[1] Reproduced from *C-14 Date List—August* 1966.

[2] Cyclostyled Bulletin referred above. Two dates are available for the neolithic levels of the site.

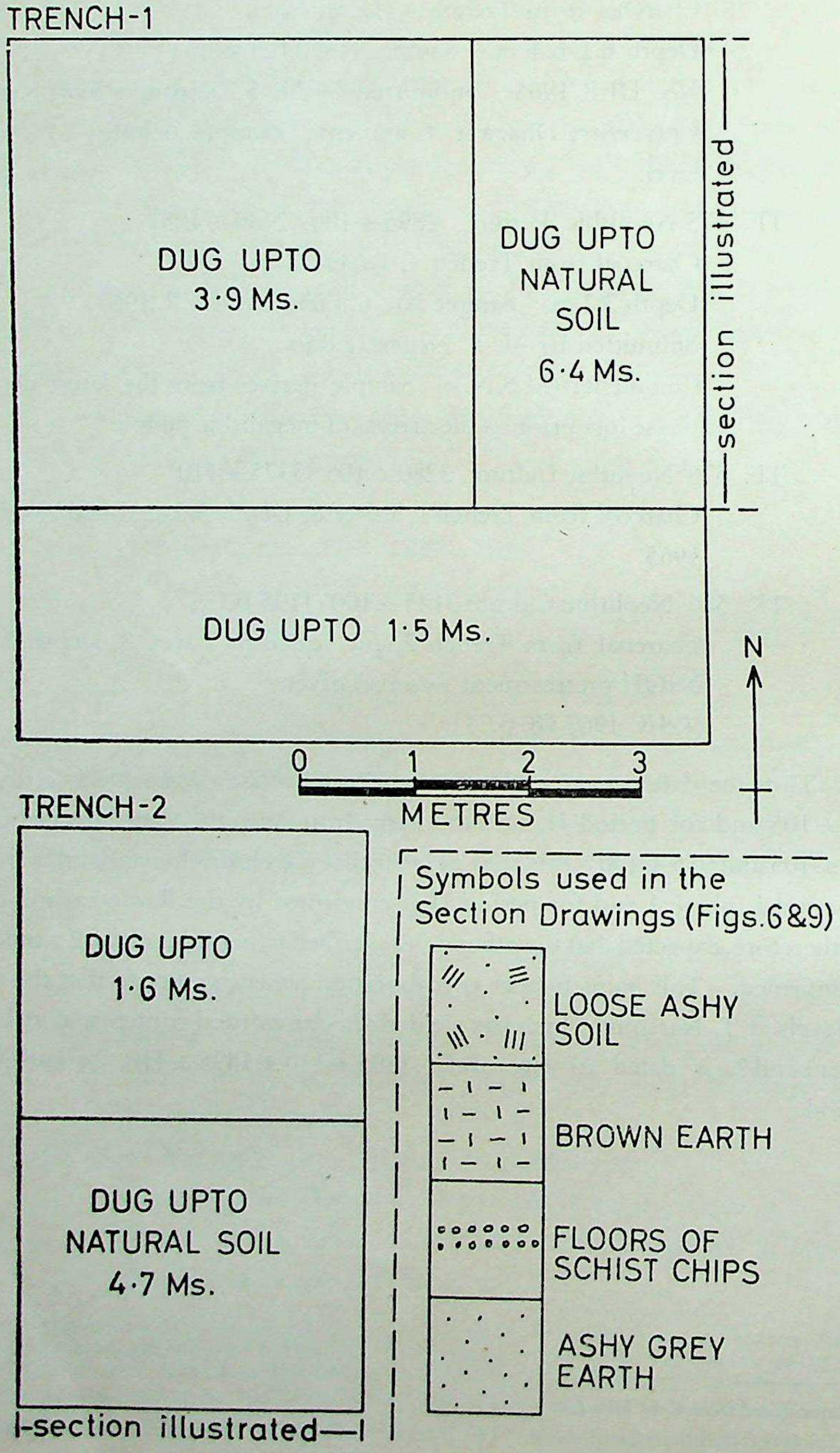

TRENCH-1
DUG UPTO 3·9 Ms.
DUG UPTO NATURAL SOIL 6·4 Ms.
section illustrated
DUG UPTO 1·5 Ms.
N
0
1
2
3
METRES
TRENCH-2
DUG UPTO 1·6 Ms.
DUG UPTO NATURAL SOIL 4·7 Ms.
section illustrated
Symbols used in the Section Drawings (Figs.6&9)
LOOSE ASHY SOIL
BROWN EARTH
FLOORS OF SCHIST CHIPS
ASHY GREY EARTH

FIG. 5. Index to excavated area of Trenches 1 and 2.

THE EXCAVATIONS

The extensive habitational mound, locally called 'Kote', is located adjacent to the village on the northern end. The site extends approximately in an area of 500 m. × 270 m. Except the northern part, the mound appears to have been much disturbed by the construction of a mud fort, possibly in the mediaeval period and by the earth grabbers. There is also a deep moat cut around the fort area. Even the top portion of the northern part is slightly disturbed by cultivation. But the lower deposits appeared to be intact (Pl. IA, Figs. 3-4).

Excavations were, therefore, conducted on the northern part of the mound, bearing survey No. 8. This area is sloping towards the northern and north-western ends. Two trenches were laid in this area and dug up to the natural soil. They measured 6 m. N-S × 6 m. E-W and 5 m. N-S × 3 m. E-W and were called HLR. 1 and HLR. 2 respectively. Besides these, on the south-eastern slope of the excavated mound, near the junction of the moat and the river, a double-pot burial was noticed on the surface. To clear this up, a small square was dug, which exposed a large pit, yielding antiquities of the overlap phase. It was, however, found that the pot burial was cut and destroyed by the pit and therefore, the pit was not completely cleared. But pottery was collected.

The Trenches

HLR. 1. This trench was laid at the highest point of the mound, north of the moat, as it was expected to give a complete sequence of cultures in the site. The trench measured 6 m. × 6 m. But after clearing a debris of 1.50 m. it was noticed that this was much disturbed by several pits of modern burials. Therefore, the trench was subdivided into 9 squares of 2 m. each. Further digging was confined to 6 squares, the southern 3 squares being abandoned. After digging to a depth of 3.90 m. digging was further restricted to the squares 1 and 6, in which natural soil was struck (see Fig. 5). The total depth of cultural deposit was found to be 6.40 m. as revealed from sub-squares 1 and 6.

HLR. 2. This trench was laid in the centre of the locality, north of the moat, to cross-check the stratigraphy and cultural phases as it showed little disturbance at the top stratum. Except the top humus, dependable stratigraphy was obtained in this trench. The trench was divided into two equal parts. The northern half was dug to a depth of only 1.60 m. and for want of time, digging was confined only in the southern half reaching the natural soil at a depth of 4.70 m.

STRATA AND STRUCTURES

HLR. 1

Stratigraphy. As already mentioned, although this trench measured 6 m. × 6 m., in the final stage digging had to be restricted to sub-squares 1 and 6 wherein natural soil was struck at a depth of 6.40 m. In all, 14 layers were distinguished (Pl. IIA, Fig. 6).

Layer 1 average depth of 1.30 m., the maximum being 1.50 m. at the north-eastern corner of the trench. The top of this layer is completely disturbed by ploughing, while the rest, by several pits dug for modern burials. As many as 7 modern burials were encountered. It is composed of very loose, ashy grey earth, with stones and skeletal remains of recent burials. It yielded a large quantity of mixed antiquities.

Layer 2 is found only in patches, in parts of the trench. It is composed of bands of ash and lime, and burnt streaks. Its average thickness is about 30 cm. This layer is also disturbed.

Layer 3 is composed of slightly compact, brown soil with bands of burnings. Dependable strata are encountered from this layer. Its average thickness is about 40 cm.

Layer 4 is composed of dark brown, compact earth with burnt bands and showing well rammed floors of lime and chips of schist. The layer exhibits much burning activity. Average thickness 45 cm.

Layer 5 is composed of ashy grey loose earth with white bands. It slopes towards north and is compressed into a pit at the north-east corner. Average thickness 40 cm.

A number of pits were found in the above layers, particularly Layer 5.

Layer 6 is composed of very compact brownish grey earth, generally of uniform thickness of about 43 cm. It is noteworthy that pottery and other antiquities become less in this layer.

Layer 7 with an average thickness of 50 cm., is composed of compact ashy grey earth with bands of red earth here and there, and mixed with

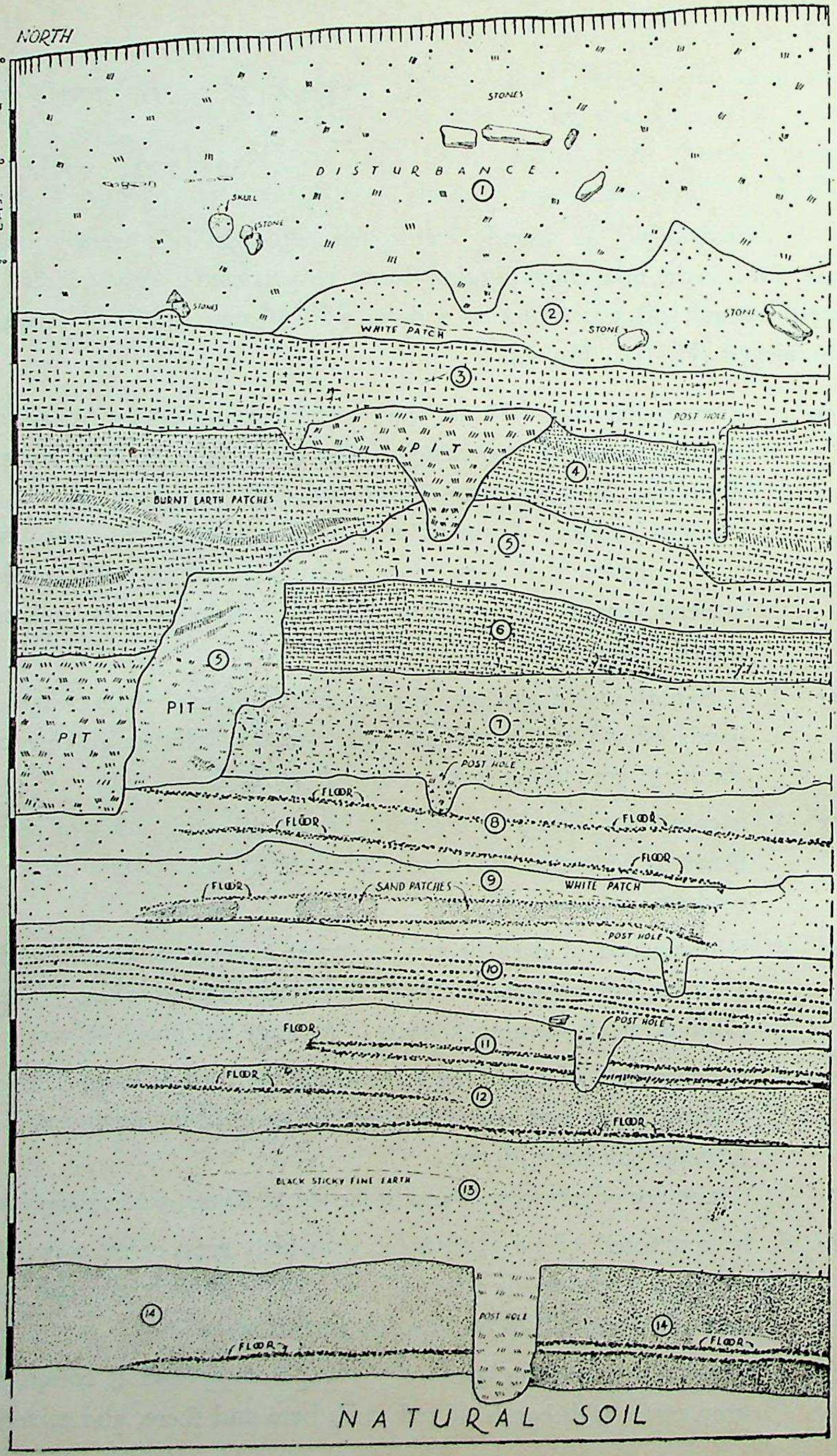

NORTH
0
25
50
CMS.
100
STONES
DISTURBANCE
①
SKULL
STONE
STONES
WHITE PATCH
②
STONE
STONE
③
POST HOLE
PIT
④
BURNT EARTH PATCHES
⑤
⑥
⑤
PIT
PIT
⑦
POST HOLE
FLOOR
⑧
FLOOR
FLOOR
FLOOR
⑨
SAND PATCHES
WHITE PATCH
FLOOR
POST HOLE
⑩
FLOOR
POST HOLE
⑪
FLOOR
⑫
FLOOR
BLACK STICKY FINE EARTH
⑬
⑭
POST HOLE
⑭
FLOOR
FLOOR
NATURAL SOIL

FIG. 6. Section Facing West. Trench 1.

charcoal bits. Animal bones start occurring in this layer. Another noteworthy feature is that the Iron Age black-and-red ware occurs in negligible quantity, while the neolithic wares increase.

Layer 8 is more ashy and less compact and is of an average thickness of 40 cm. It is composed of brownish and green schist bands which form well rammed floor beds. As many as three such floor beds are clearly visible, in between which there is a thin layer of debris. Plenty of charcoal is also found.

Layer 9 Composed of an average thickness of 40 cm., this layer is of rather loose, ashy earth with well rammed floors of chips of schist and having black ash streaks at different levels. The section facing west (Pl. IIA) shows a thick band of sand which was spread to level the uneven floor of a circular house. The sand was well rammed over which was laid a thick bedding of brownish chips of schist, which again was rammed. Two circular house plans were exposed in this layer which will be described presently. Lots of charcoal occurred. A double urn burial was sealed by this layer.

Layer 10 Almost uniform in thickness of about 40 cm, this layer is noteworthy for the series of floor beddings. As many as 5 floors, made up of chips of green schist, were exposed. Besides a thin deposit of debris, plenty of charcoal was also found in this layer. The double urn burial belongs to this layer sealed by Layer 9.

Layers 9 and 10 are also noteworthy for the large quantity of stone blades and interesting copper tools.

Layer 11 average thickness of 30 cm., compact ashy grey, fine powdery debris. Two distinctive thin floors again made up of schist bedding are found.

Layer 12 average thickness of about 30 cm. and composed of compact, ashy earth with white bands here and there. Two thin floors are again noticed in this layer.

Layer 13 very compact, ashy grey earth without any floors, but having a patch of black, sticky fine earth ; average thickness of 65 cm.

Layer 14 composed of very compact grey soil with white and brown thick bands here and there. About 55 cm. in thickness. Below this layer, was struck the very compact, dark brown natural soil.

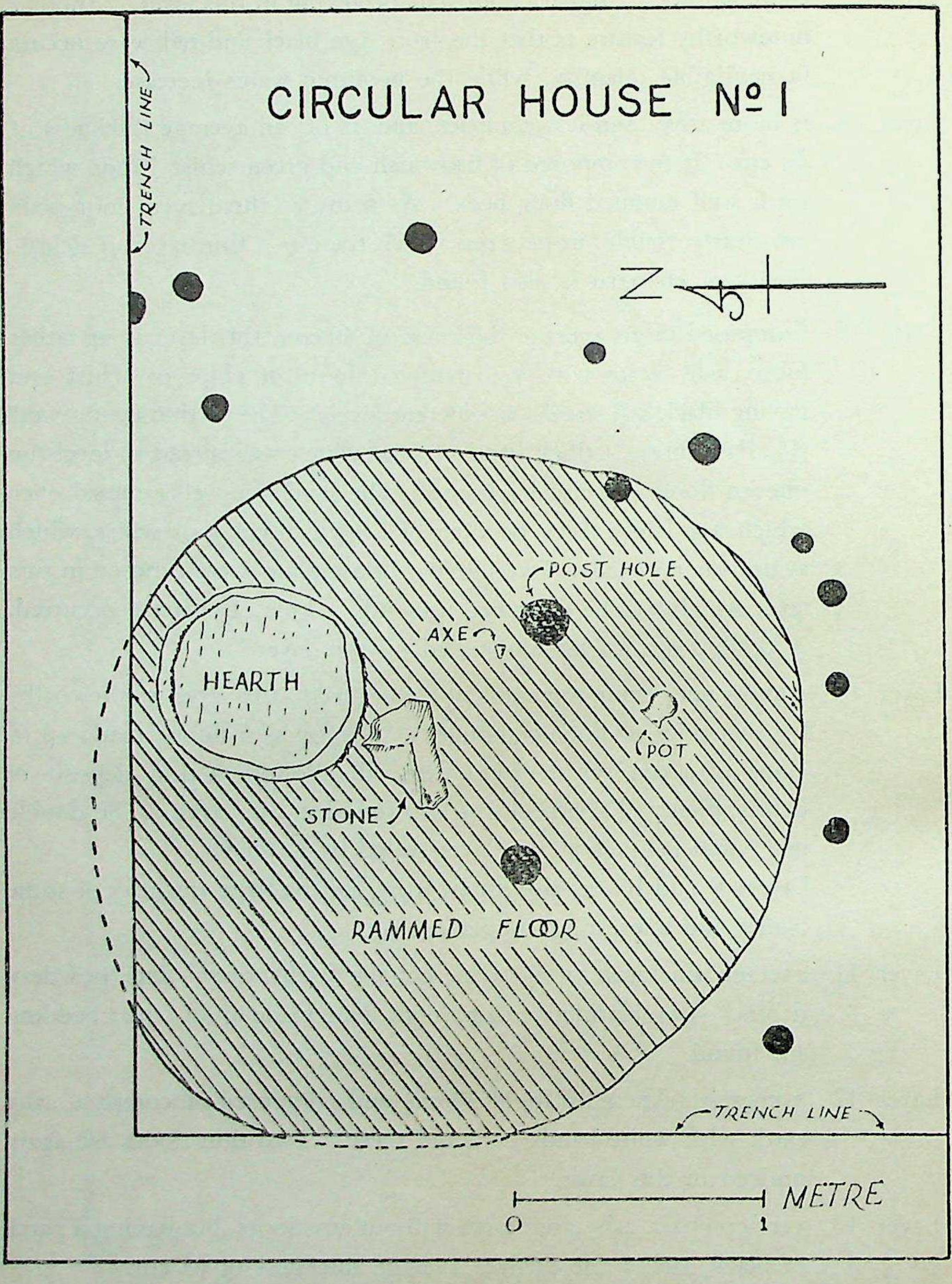

CIRCULAR HOUSE Nº I
TRENCH LINE
N
POST HOLE
AXE
HEARTH
POT
STONE
RAMMED FLOOR
TRENCH LINE
METRE
0
1

FIG. 7. Plan of Circular House No. 1, Trench 1.

The last two layers are distinguished by the occurrence of pale grey ware.

Structures

The lowest layers, *viz.*, 13 and 14 are devoid of any evidence of structures in the excavated area.

But from Layer 12 upwards, a large number of floors are encountered. Again, these are confined only up to the Layer 8, beyond which no floors are found. The floors are made up of a compact bedding of chips of schist stone which is available in the hilly surroundings of the village. First, a layer of such chips was laid which was well rammed and over this a thin layer of mud was spread and again rammed. Over this floor was the cultural debris yielding antiquities. It was also noticed that whenever the floor surface, thus prepared, was uneven, fine river sand was spread and rammed, over which another thin layer of earth was spread.

Since the area dug was limited, it is difficult to distinguish the structural phases distinctly, as the occupation is continuous. However, remains of two complete circular huts have been exposed. Both the huts occurred in Layer 9.

House No. 1 (Pl. IIIA; Fig. 7).

Remains of this house were found at a depth of about 3.90 m., in the north-western part of Tr. 1 extending in sub-squares 2, 3, 4 and 5 and in Layer 9. It is a circular hut, 3 m. in diameter, with well rammed floor and enclosed by a circular wall, as discerned by the circular post-holes found at intervals, containing fibrous remains of bamboos. The floor was found to be successively raised several times by giving a bedding of chips of schist stone and rammed earth. There were two post-holes in the centre of the hut which probably supported a conical roof. At the northern part of the house was a circular hearth or fireplace reminiscent of the one encountered at Chandoli (Deo and Ansari, 1965, Fig. 8a). The hearth contained a lot of ash and charcoal. On the floor, in the central part were a polished stone axe (Pl. IXA, 1, Fig. 22, No. 3), and a fragment of a pottery head-rest (Pl. XIVA, Fig. 26, No. 1).

The most interesting find from the floor of this house is the charred grains, identified as *ragi, Eleusine coracana* (see below section on Plant Economy). They are found for the first time in so early an age as the neolithic-chalcolithic context in India. Even now the main food of the farmer class of this region and further south, is *ragi*.

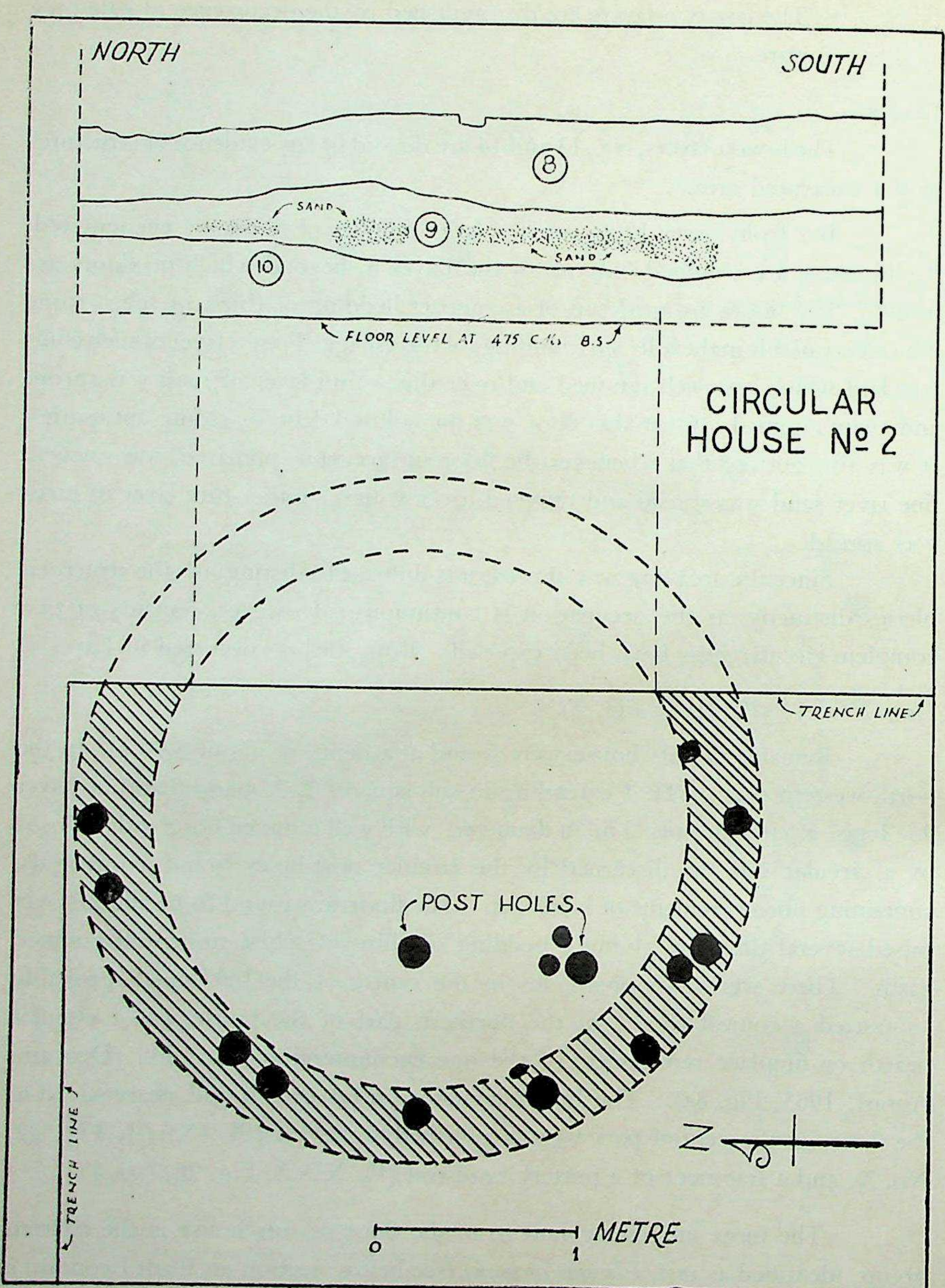

NORTH
SOUTH
8
SAND
9
SAND
10
FLOOR LEVEL AT 475 C.Ms B.S
CIRCULAR HOUSE Nº 2
TRENCH LINE
POST HOLES
Z
TRENCH LINE
0
1
METRE

FIG. 8. Plan of Circular House No. 2. Trench 1.

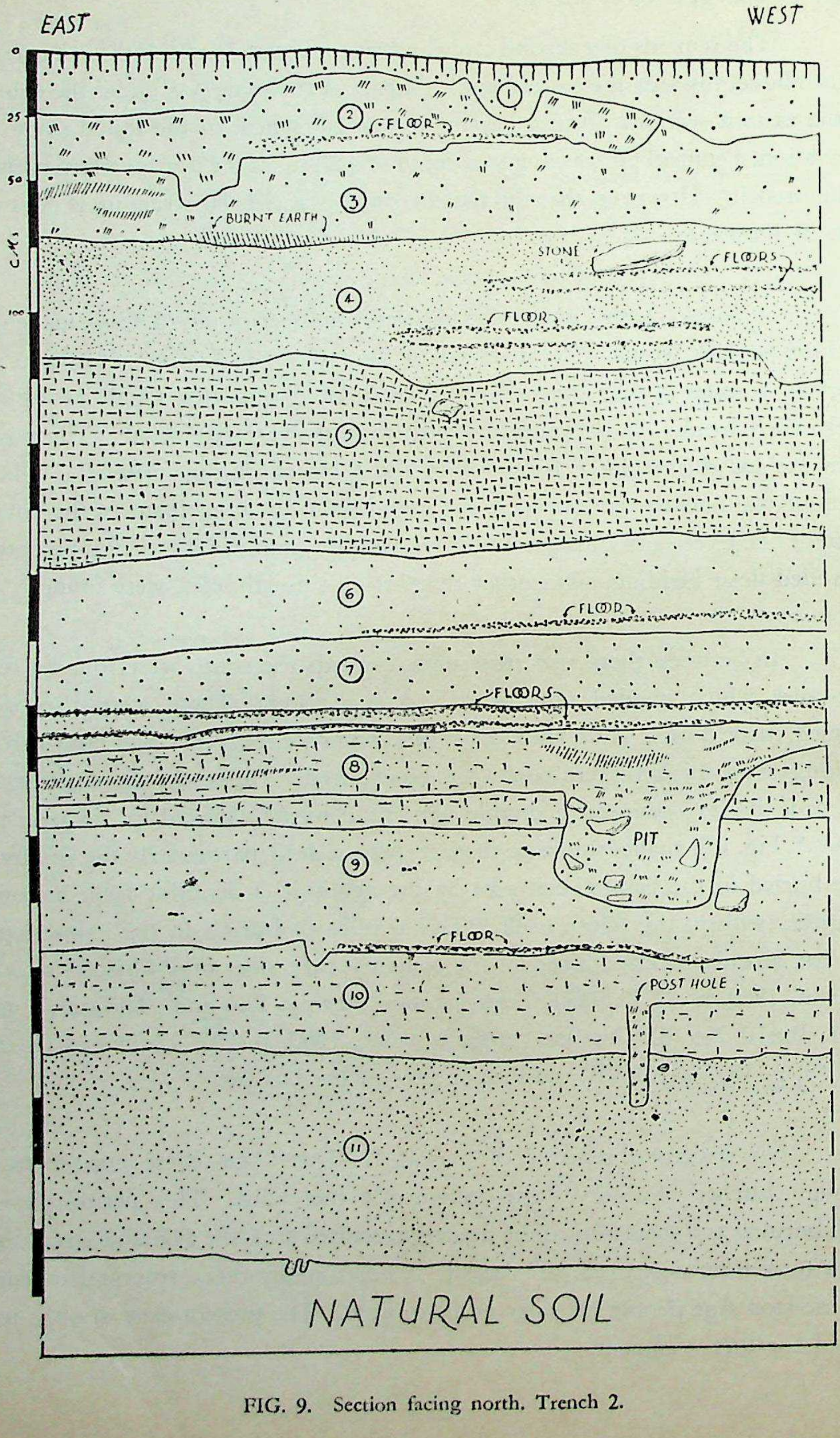
House No. 2 (Pl. IIIB, Fig. 8)

The remains of a second circular structure were found in the same level as the above, towards the eastern end. A part of the same was under the debris in the eastern section. And a part of it was cut when, in the initial stage of excavation, a control pit was dug to a depth of 4.20 m. at the north-eastern corner of the trench. However, that the remains were of a circular structure is clear as seen in Figure 8.

As in No. 1, this house also showed a number of raised floors made up of chips of schist stone. The diameter of the interior is 2.60 m. Post-holes at intervals, circular in plan, were exposed which have supported a wall, probably, of thatched bamboo. However, no wall remains were recovered. The post-holes yielded disintegrated bamboos in the form of fibrous material. When the floor was uneven, as noticed at one raised floor, the inhabitants of the house brought fine river sand and spread it in the interior, rammed it well and prepared a levelled floor bedding. No other remains of a hearth, etc., were found.

In between these two structures, towards the south were found a few post-holes which yielded remains of bamboo fibres. There were also well rammed, made floors. But, since the southern part of the trench was not cleared, the interior of this structure could not be exposed. However, the clearing of the made floors, exposed a double urn child burial, buried in an oval pit (Pl. IVA, Fig. 10), again exhibiting the fact that the dead, particularly the children, were buried in the habitational area by the neolithic-chalcolithic folk, in some instances, within the house itself. This feature of burials in the habitational area has already been noticed in the contemporary sites of Piklihal, site VII (Allchin, 1960, p. 22 Pl. 18a), Tekkalakota (Nagaraja Rao and Malhotra, 1965, p. 31, Burial No. 3), Nevasa (Sankalia *et al.*, 1960, p. 23), Daimabad (*IAR*, 1958-59, p. 18, Pl. XXVB) and other sites of the Deccan.

No structural remains of period II—Iron Age—were encountered, although patches of floors were occasionally met with. This period shows much burning and therefore, in the limited excavated area, the available structures might have been destroyed. If the site is horizontally dug, structural remains of these Iron Age people may also come to light. The present excavation is too limited for any comment.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POST HOLE
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NATURAL SOIL

FIG. 9. Section facing north. Trench 2.

HLR. 2

This trench, as already mentioned, measured 5 m. N-S × 3 m. E-W. But, after digging the whole trench to a depth of 1.60 m. excavation was restricted to the southern half of the trench, wherein natural soil was struck at a depth of 4.70 m. In all, 11 layers were distinguished in this deposit (Pl. IIB, Fig. 9).

Layer 1 The surface humus of about 15 cm. thickness, composed of extremely loose ashy soil.

Layer 2 Slightly compact, and composed of brick red and ashy soil, overlying a thin bed of chips of schist confined only to the south-east corner. About 30 cm. in thickness.

Layer 3 Composed of loose, white ashy soil, with black streaks here and there. 30 cm. in thickness.

Layer 4 Compact ashy soil mixed with charcoal bits and chips of schist. Two floors, with chips of schist stone make up the bedding. Ashy white streaks occur here and there. The layer is disturbed at the south-east corner. About 45 cm. in thickness.

Layer 5 Thick, compact, grey earth sparsely mixed with chips of stone and ash streaks found here and there. Antiquities become less. 75 cm. in thickness.

Layer 6 Loose ashy soil mixed with charcoal bits and showing ashy floor level made up of chips of schist stone. About 40 cm. in thickness.

Layer 7 The upper part of this layer is composed of a very loose grey soil and the lower part is made up of two beddings of compact earth. The eastern half is of red earth while the western half is of compact black soil. About 40 cm. in thickness.

Layer 8 More ashy grey layer with streaks of white ash throughout, and overlying a thick bedding of chips of schist, thus making two floors. While generally the schist chips have been light green in colour one of the beddings shows chips of red schist. This layer seals a pit which cuts the floor and the Layer 9 below. It is about 30 cm. in thickness.

Layer 9 Composed again of loose ashy grey earth containing charcoal bits and ash streaks. The lower part of the layer overlies a thin floor of compact red earth. About 45 cm. in thickness.

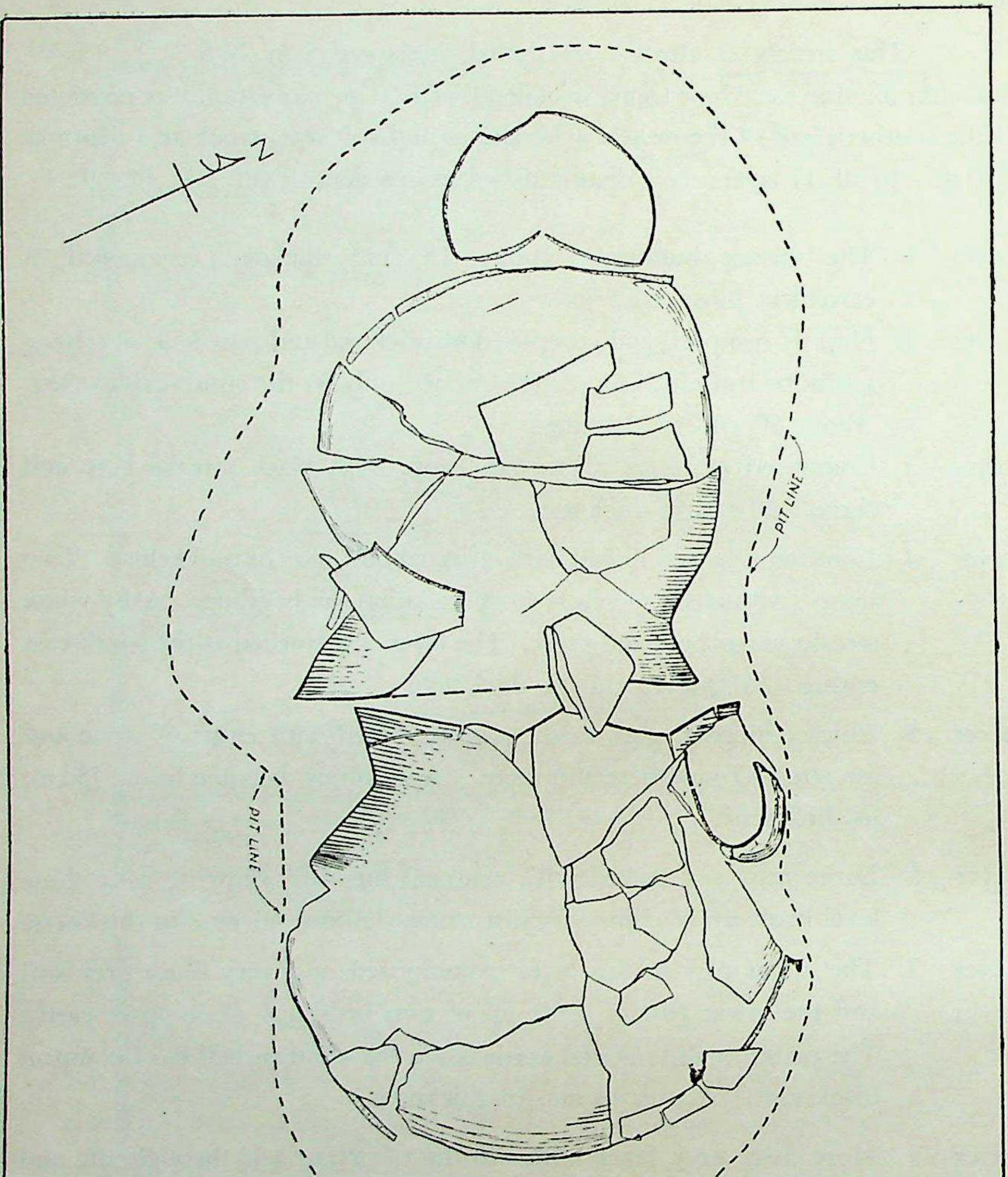
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FIG. 10. Double-urn burial No. 1. Trench 1, Period I, Phase 2.

Layer 10 Composed of blackish grey ashy soil mixed with charcoal bits. About 40 cm. in thickness.

Layer 11 Compact whitish ashy soil about 80 cm. in thickness.

Below this is very compact, dark brown, natural soil devoid of any antiquities. No structural remains were encountered in this trench, possibly due to the limited nature of the dig. The only evidence which shows that this part of the site also had structures, is the number of floors made up of chips of the locally available schist and a couple of post-holes.

BURIALS

Burials were rare within the limited excavations. The earliest phase, exposed in Trenches 1 and 2, is devoid of any burials. But a large-scale excavation would certainly bring to light the nature of the disposal of the dead by the earliest settlers of the site.

Phase 2, of period I, has yielded evidence of burials.

Burial No. 1 (Pl. IVA, Fig. 10)

This is a burial of a child in two urns. The two urns, of brown-and-black ware (Pl. IVB, Fig. 15, Nos. 1-2), were found interred mouth to mouth in a pit, oval shape, in almost east-west orientation. The pit was dug into the Layer 10, a series of floors being cut, and was sealed by Layer 9, which itself consists of a number of floors. Thus the burial was under a well rammed floor, proving that it was within a house. This is further confirmed by a few post-holes found around the burial pit.

The urns were in a completely crushed condition, due to the weight of the superimposed debris. They contained within them, a few bones of a child, consisting of a few fragments of skull, ribs and teeth. The other bones were completely disintegrated. The teeth and fragments of the skull were in the eastern jar while the ribs were at the middle part of the coffin and possibly the extremities were in the western pot. At the western end was a bowl with flaring sides, of burnished grey ware (Pl. IVB, 3; Fig. 12, No. 4) while another bowl (Pl. IVB, 4; Fig. 12, No. 7) was found at the northern side of the eastern pot at the neck. Within the western pot was another small bowl with a squat body and smeared with red ochre in the interior (Pl. IVB, 5; Fig. 12, No. 15).

All these small vessels formed the burial furniture meant for use of the child in the life after death.

It is interesting that similar multiple-pot burials have been found in the excavated sites of Nevasa (Sankalia *et al.*, 1960, p. 23), Daimabad (*IAR*, 1958-59, p. 18), Brahmagiri (Wheeler, 1948, pl. CVIII, B) and Tekkalakota (Nagaraja Rao and Malhotra, 1965, pl. XIV). The present example suggests the contemporaneity of this phase at Hallur with them, and that the people who occupied the various sites belonged to a common stock with common traditions.

Burial No. 2 (Not illustrated)

This was also a double pot burial, encountered in Tr. 2, interred in a pit sealed by Layer 5. But, a later pit dug into the burial pit had destroyed the burial, only parts of the burial urns mouth-to-mouth remaining. The contents of the burial were also destroyed. But that a double urn-burial belonging to the later half of the phase 2, of period I, was there, is proved beyond doubt.

Burial No. 3 (Not illustrated)

A double pot burial was noticed on the surface on the south-eastern slope of the excavated mound, near the junction of the moat and the river. When a small square was dug to expose this burial, a large pit was encountered, yielding a large quantity of pottery of the overlap phase. This pit had cut the original pit of the double urn burial and therefore, the remnants of the burial were cleared up. The jars used for the burial purpose were large storage jars, with a crude applique decoration depicting a rope or chain pattern executed by incising. At the termination of this applique pattern, two small knobs conical in shape, were affixed (Fig. 14, No. 1). Thus the burial jars are similar to those found at Tekkalakota (Nagaraja Rao and Malhotra, 1965, p. 96, pl. XIV). As pointed out elsewhere (Nagaraja Rao and Malhotra, 1965, p. 93), the shape of the burial urns and the typical applique knobs of the burial jars indicate symbolically that the dead was given a re-entry into the mother's womb, even when buried.

Burials of period II, *i.e.,* the Iron Age, do not occur in the habitational area, at this site. But the graves, in the form of dolmenoid cists and stone circles, found in hundreds about 3 miles to the north of the site, on the slopes of the hillock of Bhairavanapada and to the west about 2 miles on the hill tract, may belong to this period. This could be confirmed only by excavations.

STUDY OF ANTIQUITIES

A. POTTERY

The study of pottery from the site of Hallur closely follows the cultural sequence. Thus the pottery will fall into three groups, viz., the Neolithic, the Iron Age and the early Historic. The characteristic features of the various wares have been described under each particular ware.

Pottery from the neolithic period consists of pale grey ware, burnished wares, both with the ochre painted variety ; a black painted burnished ware ; brown-and-black ware ; and a painted black-on-red ware.

The Iron Age pottery, mainly consists of the typical black-and-red ware and all black ware, both with a white painted variety. The latter is found for the first time in this part of the country, associated with Iron Age. A red ware is also found belonging to this period.

Though there is no undisturbed cultural deposit in this site, the fact that it was inhabited during the early historic period is attested by the pottery of that period, recovered from the upper disturbed strata. The pottery of this period mainly consists of the black-and-red ware, russet-coated painted ware and red polished ware.

Period I, Neolithic

The neolithic pottery of the site is generally handmade, but for a sparse quantity of wheel-thrown ware which occurs in the later part of phase 2 of this period. The fabrics represent both burnished and unburnished varieties. The earliest phase is characterised by a pale grey ware and a burnished grey ware, both with the post-firing, ochre painted decoration ; and a pre-firing black-on-red ware. In fact, the cultural phases of this period are distinguished mainly on the basis of ceramic evidence. In phase 2 of this period burnished ware with the post-firing ochre painted variety continues, but pale grey ware becomes conspicuous by its absence, a feature noticed in many sites of this region such as Tekkalakota (Nagaraja Rao and Malhotra, 1965, p. 4) and Sanganakal (Ansari and Nagaraja Rao, 1969, p. 22). Instead, a coarse, brown-and-black pottery becomes a

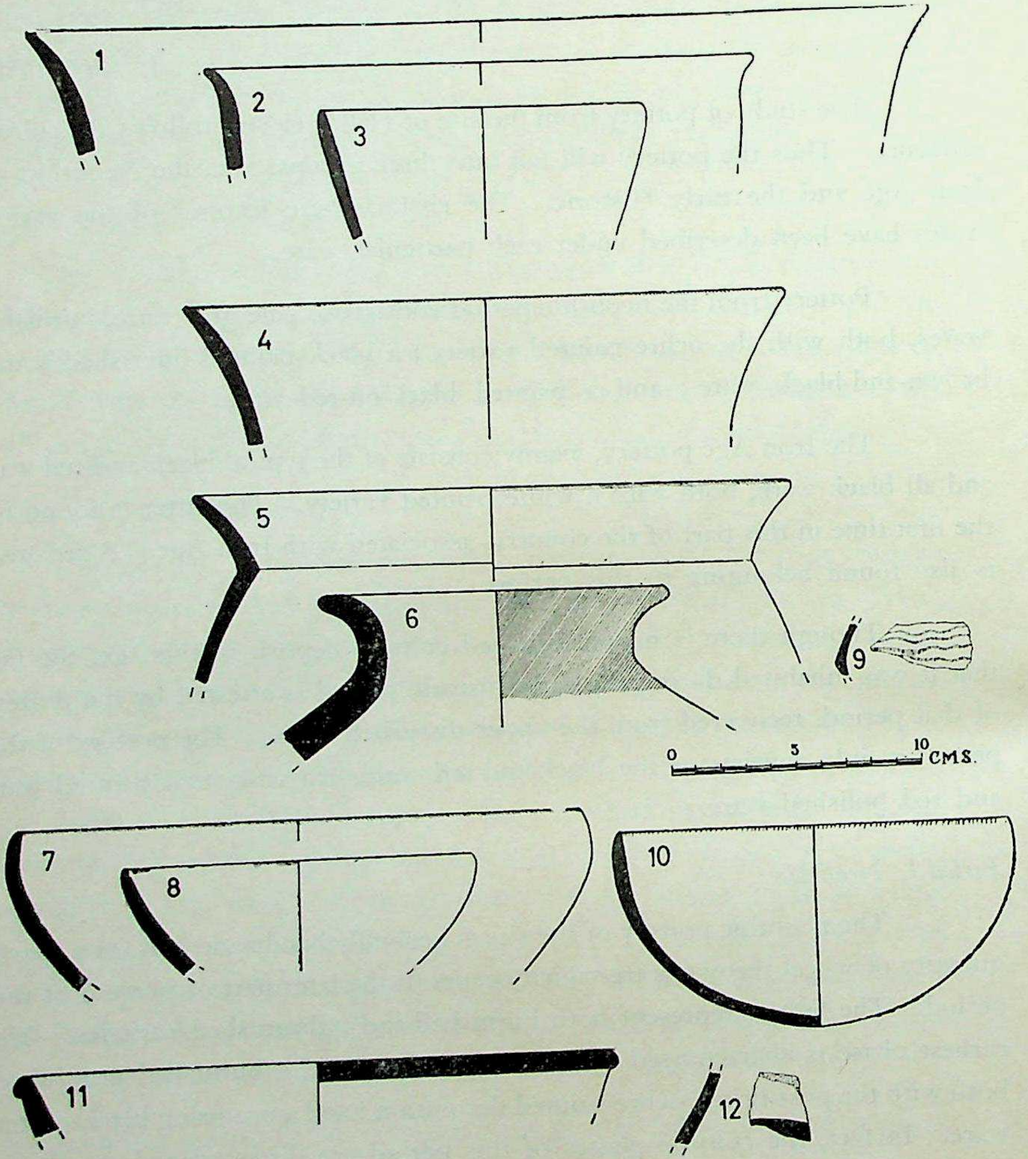
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FIG. 11. Pale grey ware 1–5 ; Ochre painted variety 6 & 9 ; prefiring black painted red ware 7, 8 and 10–12.

major ware of the phase. The other ware worthy of note is the black-on-red painted ware, already mentioned and comparable to the Jorwe ware. There is apparently some as yet unexplained development of the surface treatment of the burnished ware, for in phase 2, its surface begins to crackle and is characteristically harder than the burnished ware of phase 1. The surface of much of this later ware becomes distinctly blotchy in coloration. It would seem likely that these features are connected in some way with the surface fusion of the clay, and perhaps also with the application of some alkaline rich solution. These developments seem to be closely parallel to the appearance of the A4 and A5 wares at Piklihal described by Allchin (Allchin, 1960, p. 49). The brown-and-black ware likewise seems to stand in some relationship to the coarse ware associated with the 'intrusion' phase at Piklihal.

As already stated, the pottery of this period is generally handmade. The clay for making the ceramics in phase 1 appears to be much finer than that of the later phase, and even the products are of finer finish. Occasionally quartz powder and mica seem to have been mixed in the clay. Phase 2, however, exhibits a degeneration in the pottery tradition as the wares become very coarse and rough. Even the clay used appears to be coarse. But in the shaping of the vessels the potter of neolithic Hallur shows a high degree of proficiency. Perfect globular vessels and regular channel and tubular spouts prove his competency in giving regular forms to the vessels.

The various special and peculiar types noted at Piklihal (Allchin, 1960, p. 28), Tekkalakota (Nagaraja Rao and Malhotra, 1965, p. 30) and other neolithic sites also occur at this site and are worth mentioning.

(i) *Handles :*

Three kinds of handles are noted, viz., lug, knob and loop.

The lugs are mainly found in the large or deep bowls, probably on two sides to facilitate holding. They are handmoulded, when the vessel was still in leather hard condition. The lug ends are either rectangular or rounded. They occur in the earliest level and survive into the Iron Age (Fig. 14, Nos. 7-9). Such lug-handled vessels are found in large quantities both in this site and at T. Narsipur.[1] Analogous lug-handled vessels also occur at Brahmagiri (Wheeler, 1948, Fig. 23, T. 77, p. 231), Sanganakal (Subbarao, 1948, p. 17, pl. VIII, xv c & xv d), Maski (Thapar, 1957, fig. 10, 2e, p. 42) and Piklihal (Allchin, 1960, pl. 33, types, 60 & 61).

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[1] From a personal study of the pottery, with the permission of Dr. Seshadri, the excavator.

The knob and loop handles are, however, found only in a few examples of lids at this site (Fig. 16, Nos. 16, and 13 respectively).

(ii) *Spouts :*

The spouts again are tubular, recurved and channel.

The tubular and recurved spouts are luted to the vessels. They are done so well in some cases, that it is difficult to detect whether they are actually luted, unless the interior is examined. A couple of examples of these occur (Fig. 12, Nos. 16-17).

Channel spouts occur mostly in the bowls of burnished wares. They are just drawn out and smoothened, at the time of shaping the bowls. Again, the ends are sometimes rectangular and out-curved, and sometimes very narrow and triangular (Fig. 12, No. 8; Fig. 15, No. 9, respectively).

The use of such specialised types of vessels is not clear. But that the channel spouts and tubular spouts were made with the specific purpose of controlling the flow of liquid in the vessel is apparent.

(iii) *Lips :*

These are also found to occur at the rim of the bowls.

A part of the rim was pinched and a very short lip was drawn out (Fig. 12, 9 & 10). They are found in the majority of the wares in the neolithic phase. Such bowls with pinched lip survive into the Iron Age, in the black-and-red ware.

(iv) *Bases :*

Generally the bases of vessels are rounded or flat.

Some types such as pedestalled goblets with hollow bases are also found (Fig. 13, Nos. 14 & 15). But fragment of a large vessel has a thick, disc base which shows mat impressions (Pl. VIA; Fig. 15, No. 6). It is interesting to note that the impression indicates that the mat is made of reeds. Impressions of date palm mats have been noticed at many sites such as Burzahom (*IAR*, 1960-61, p. 11 & pl. XVIA) and Tekkalakota (Nagaraja Rao and Malhotra, 1965, p. 36). One more example from Bellary is in the Pitt-Rivers Museum, at Oxford and is referred to by Allchin (1960, p. 135). Around Tekkalakota, date-palm trees were in plenty, whereas they are scarce near Hallur. But plenty of reeds grow on the banks of the Tungabhadra which were probably made into mats.

Surface Treatment

As at various neolithic-chalcolithic sites of the Deccan, the following surface treatments were noticed at Hallur also.

(i) *Burnishing :*

This treatment is found in the earliest phase of occupation, effected on the pale grey and greyish black fabric. In fact, the latter is found in such quantity that a separate group called burnished grey ware is distinguished. This ware survives into the later phases, but the technique of burnishing seems to die out, as only coarse fabrics become more common.

Burnishing seems to have been done with either smooth stone pebbles or bone. While some of the vessels exhibit highly burnished exterior, in some others burnishing is found in the interior only as far as the palm could reach. Vessels with wide mouths such as bowls show this treatment all over.

(ii) *Slip :*

The pale grey, and the brownish grey pottery show a slip over their surface. Sometimes, these slips are micaceous.

(iii) *Surface roughening or Rustication :*

This feature is observed in some of the coarse varieties of grey, dull red, and brown-and-black wares. The surfaces of some of the vessels show that roughening is effected with either grass or rags, as the impressions show. In some instances the use of quartz powder or fine sand used as abrasives, is observed.

(iv) *Applique :*

As in other sites, this is of rare and special occurrence. Some of the large vessels are decorated with a band of applique on the shoulder which is incised with short, oblique strokes, making it appear like a rope pattern. The band terminates in a curved fashion, within which are found two knobs, again applied (Pl. VB; Fig. 14, No. 1). Such huge jars are used for multiple pot burials, as evidenced at Tekkalakota. It has already been observed that the use of urns of a particular shape indicates the intention of giving the child, a symbolic re-entry into the womb of the mother (Nagaraja Rao and

Malhotra, 1965, p. 93). It is further surmised that such applique knobbed decoration, particularly on the burial jars, might represent the nipples of the mother. Such applique decorations are also found at Piklihal (Allchin, 1960, pl. 27, No. 37b, facing p. 41). Some other sherds show short, applied knobs on the shoulder (Pl. VIA, 2; Fig. 16, No. 17) the significance of which is not clear.

(*v*) *Finger pressed decoration:* The rims of some vessels show finger pressed depressions. So also the edges of some of the lids are pressed with finger, which provides a decorative feature (Pl. XIVB, 3-4; Fig. 16, Nos. 10 & 11).

(*vi*) *Incised decorations:* Some vessels show incised decorations effected either by finger nails or by reeds. The rim of a bowl with pinched lip shows such a decoration (Fig. 12, No. 10).

(*vii*) *Perforations:* Fragments of coarse grey vessels with perforations have been found. The perforations are effected from both the sides. They are generally found at the bases of the vessels. The usage of such perforated vessels have remained uncertain. Allchin (1960, p. 45) has suggested three possible alternatives: i. as braziers for burning incense; ii. as covers for boiling milk; and iii. for steam cooking of cereal products. Another suggested use is as a colander (Sankalia, 1963, p. 255). Ethnographic evidence from coastal Andhra, however, suggests yet another probable function of such vessels (Paddayya, 1969, pp. 450-455). In the village of Pamulapadu, Guntur District, perforated bowls, resembling in shape and perforations their neolithic counterparts, are used in the preparation of a delicacy called *Palatalikalu* (meaning milk tubes in Telugu) resembling macaroni. The bowl with a bold collar is used to push the paste prepared with great millet (*Holcus sorghum*) through the perforations, by applying pressure of the fist, into the boiling milk in another open mouthed vessel. The cooked product is *Palatalikalu.*

(*viii*) *Paintings:* Two kinds of paintings are noticed in the neolithic wares, viz., post-firing and pre-firing. The post-firing painted decorations are effected mostly on burnished wares. The pigment used is red ochre. Although it is found on the majority of the burnished wares of the earliest occupational phase of the site, it continues in the coarse wares of phase 2. Generally the rims of vessels are smeared with ochre. But occasionally the whole neck (Fig. 11, No. 6) or the whole interior of bowls (Fig. 12, No. 15) are smeared with ochre. In one instance the shoulder is painted with wavy lines (Fig. 11, No. 9) and in another, an animal figure (?) (Fig. 12, No. 14).

The pre-firing painted designs are of two groups: one confined to the earliest phase, and the other to the later part of phase 2.

The group from the earliest phase consists of black or purple paint painted at the rim on burnished vessels with a red slip. This corresponds to the painted wares of Brahmagiri IA (Wheeler, 1948, p. 222) and Piklihal A3 painted ware (Allchin, 1960, pp. 56-57). Painted decorations include only short strokes regularly drawn on the rim of bowl (Fig. 11, No. 10) and simple bands (Fig. 11, Nos. 11 & 12).

The other group of painted wares occurs in the later part of the phase 2 of this site. This also consists of black painted on red, matt surface of vessels. This is comparable to the famous Jorwe painted ware, painted AB ware of Piklihal (Allchin, 1960, pp. 58-60), and the various painted black-on-red ware which occur in the later phases of neolithic at Brahmagiri, Maski, Sanganakal and Tekkalakota.

Shapes of Vessels. There is no variety in the shapes and types of vessels, in the neolithic phases of the site, and only a few shapes are discernible which occur with monotonous regularity. The most common types are globular vessels of various dimensions, bowls sometimes with spouts, urns, cups and goblets. The following description of the illustrated specimens shows the range and shapes of various wares.

Pale grey ware

As explained earlier, this ware is confined only to the phase 1 of period I. Since the area excavated is limited, this is found in a limited quantity. Both burnished and unburnished varieties occur. Majority of the fragments of vessels recovered are painted with red ochre at the rim. Globular urns, with flaring rims and bowls are usual and common types which occur in this ware. The following types are illustrated :

Fig. 11

1. Rim fragment of a vessel, with flaring sides and rounded rim ; the exterior is unburnished and uneven, while the interior is burnished black. Tr. 1, Layer 14.

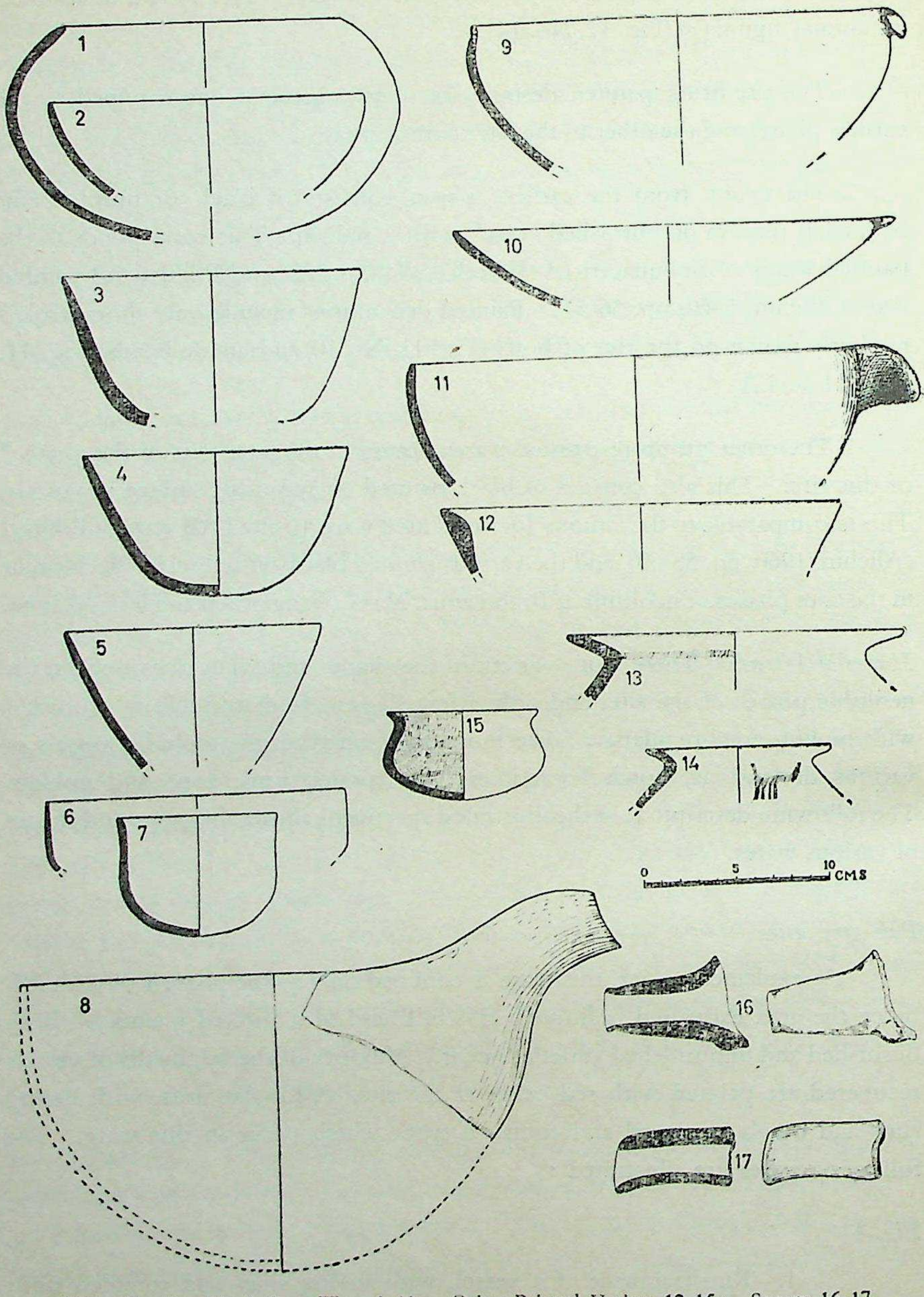
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FIG. 12. Burnished Grey Ware 1–11 ; Ochre Painted Variety 12–15 ; Spouts 16–17.

2. Fragment of a small bowl with out-curved, rounded rim ; unburnished Tr. 1, Layer 14.
3. Fragment of an almost straight-sided bowl with rounded rim ; blotchy, pale grey exterior, with slightly burnished surface. Tr. 1, Layer 14.

Ochre-painted variety

4. Rim fragment of a vessel with flaring sides and rounded rim ; interior slightly burnished and exterior unburnished ; rim painted with red ochre. Tr. 1, Layer 14.
5. Fragment of a globular vessel, with an open mouth and constricted neck, flaring sides and rounded rim ; well burnished ; the rim is painted with red ochre. Tr. 1, Layer 14.
6. Neck and rim part of a globular vessel of thick section, having a short concave neck, everted, rounded rim ; well burnished on the exterior, and only upto the neck in the interior, the rim and the shoulder are smeared with plenty of red ochre. Tr. 1, Layer 14.
7. Fragment of a shallow bowl of well burnished pale grey fabric, with incurved, rounded rim, and a shallow base ; the interior shows paring marks ; the rim is painted with red ochre. Tr. 1, Layer 14.
8. Fragment of a small bowl, with burnished surface, very slightly incurved sides ; the rim retains traces of ochre painted at the inner edge. Tr. 1, Layer 14.
9. Sherd of a small, carinated vessel, having wavy lines of red ochre, drawn horizontally above the carination. Tr. 2, Layer 11.

Burnished ware

Under this ware are grouped, the painted black or, purple-on-red ware with a red slip; the major, burnished blotchy grey ware ; and a couple of burnished brown sherds recovered from the neolithic levels.

Painted burnished ware

Only a few examples of this ware are found. They are similar to the painted wares of Brahmagiri IA and A3 painted ware of Piklihal, as already mentioned. The following examples are illustrated :

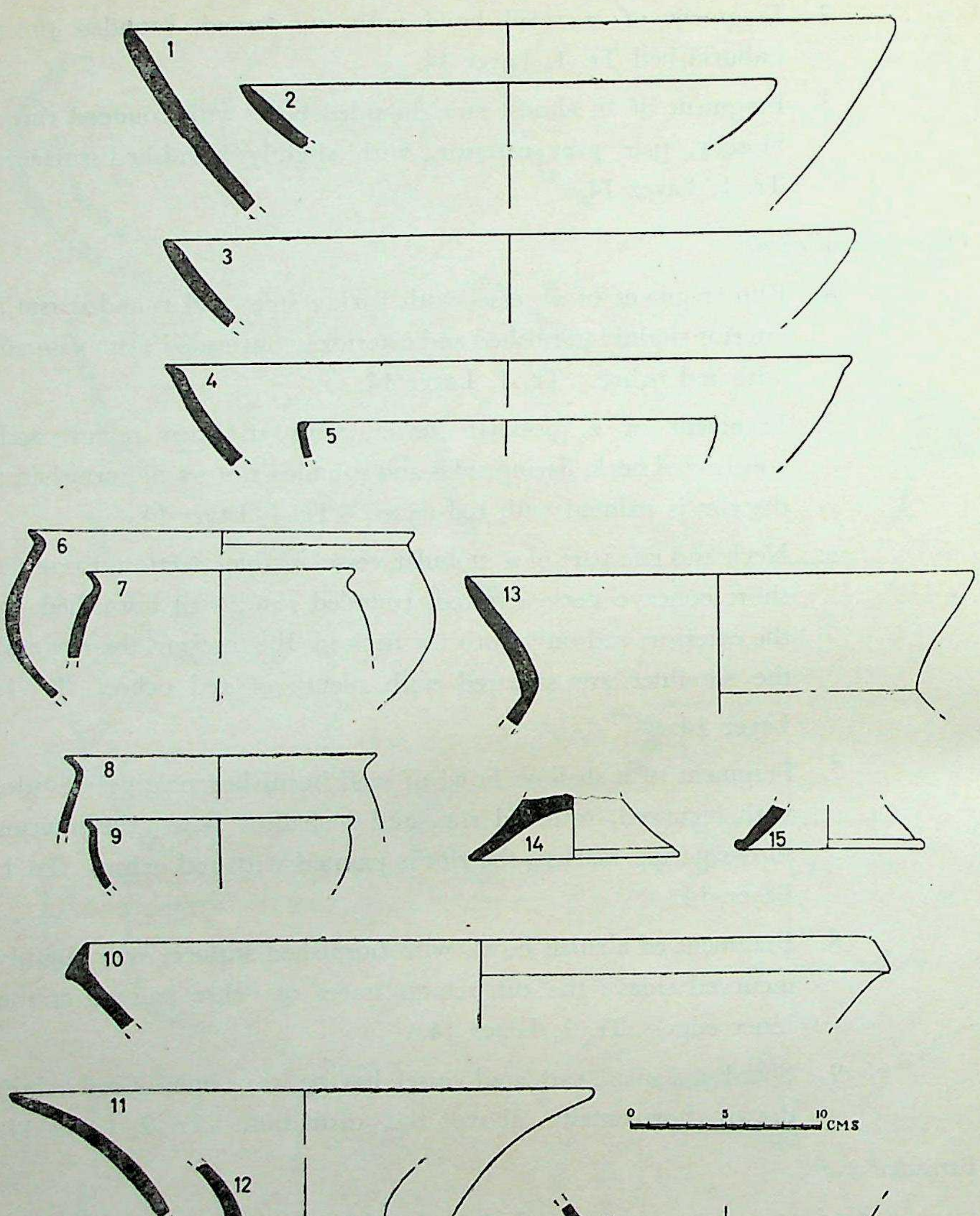
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FIG. 13. Burnished Grey Ware.

Fig. 11

10. A hemispherical bowl, of burnished, blotchy, red ware with featureless rim and rounded base ; the rim is decorated with a pre-firing painting in brownish black colour consisting of short, vertical strokes at regular intervals all around. Tr. 1, Layer 14. *cf.* PKL. pl. 33, 5m, 58T & 58W.[1]

Dr. Allchin who personally examined the bowl confirmed that it approximates very nearly to his A3 painted ware (Allchin, 1960, pp. 56-57, pl. 35, Nos. 1-8). He pointed out that this painted ware, though rare, is a regular concomitant of the lower Neolithic of Piklihal, and that it occurred also in the lowest levels of the Maski excavations of 1954. This early context appears to be further confirmed at Hallur.

11. Fragment of a small neckless vessel, with a flattened, beaded out rim and thickening sides, the rim is painted with a thick band of black paint. Tr. 1, Layer 14.
12. Shoulder fragment of a vessel, with dull red-and-black surface, the exterior is painted with a black band ; Tr. 1, Layer 13.

Burnished grey or blotchy ware

This is the major ware of phase 1, and continues throughout the neolithic phases. It has a highly burnished, grey or black or brown surface, sometimes blotchy. Bowls, also with channel spouts, seem to be the predominant type in this ware. This ware also has some ochre painted variety.

The following types are illustrated :

Fig. 12

1. Fragment of a bowl with incurved sides and rounded rim. Tr. 1, Layer 10.
2. Fragment of a shallow bowl, with convex sides and rounded rim. Tr. 1, Layer 13.
3. Fragment of a deep bowl with almost straight sides and featureless rim ; blotchy and slightly burnished surface. Tr. 1, Layer 6.

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[1] The references are to the respective reports of excavations. The abbreviations used for the sites are: BR. Brahmagiri; SGK. Sanganakallu; MSK. Maski; TKT. Tekkalakota; PKL. Piklihal; NVT. Navdatoli; NVS. Nevasa; UTN. Utnur; TNP. T. Narsipur; CH. Chandravalli; and BHM. Brahmapuri.

4. Small bowl with flaring sides and featureless rim ; it has an almost flat base ; burnished grey exterior and black interior. This was found near the base of the western end pot of the child burial No. 1, on the exterior. Tr. 1, burial pit sealed by Layer 9 (Pl. IVB, 3).

5. Fragment of a deep bowl with flaring sides and featureless rim ; the interior is black. Tr. 1, Layer 9.

6. Fragment of a bowl with straight sides, thinning towards the upper end. Tr. 1, Layer 9.

7. Small bowl, with a burnished blotchy surface, and having a rounded, internally sloping rim; the base is round. This was found placed near the neck of the eastern pot of the child burial, on the northern side. Tr. 1, burial pit sealed by Layer 9 (Pl. IVB, 4).

8. Fragment of a shallow bowl, with a high, recurved channel spout having a wide end ; of highly burnished grey fabric. Tr. 1, Layer 13.

   Similar channel spouted bowls have been reported from Patpadu (Foote, 1916, p. 115 and pl. 26; Allchin, 1962, fig. 1, No. 1, p. 223), Brahmagiri (Wheeler, 1948, p. 228, fig. 21, T44), Sanganakal (Subbarao, 1948, pl. VIII, T. XVe, p. 17) and T. Narsipur (Sankalia, 1963, fig. 75, No. 1).

9. Fragment of a hemispherical bowl with a slightly everted rim ; there is a pinched and drawn out lip, which serves as a short, channel spout. Tr. 1, Layer 9.

Bowls with pinched lips occur in phase 1, and also in the Iron Age black-and-red ware of this site (Fig. 17, No. 16); bowls with pinched lips also occur at Tekkalakota (Nagaraja Rao & Malhotra, 1965, fig. 15c) and Piklihal (Allchin, 1960, pl. 25, 14a & c).

Bowls with multiple pinched lips were found during the large scale excavations at Tekkalakota by the Deccan College. Such bowls with multiple lips have also been found at Hissar IIIc (Schmidt, 1937, p. 270, pl. XLIV, H. 2485).

Fig. 12

10. Fragment of a bowl with a lip pinched at one place ; the rim is decorated with incised vertical lines. Tr. 1, Layer 10.

16. A tubular spout, which is narrowing towards the end, where it is grooved; luted towards the base, probably of a bowl; well burnished black surface. Tr. 1, Layer 6.

17. A tubular spout which has a highly burnished blotchy grey and black surface ; the spout is slightly recurved near the end. Tr. 1, Layer 7.

Fig. 13

1. Fragment of bowl with a wide mouth and rounded rim ; Tr. 1, Layer 10.

2. Fragment of a small bowl or dish, with rounded rim ; well burnished black surface.

3. Fragment of a shallow dish of a burnished, buff grey ware, with rounded rim ; has a micaceous texture. Tr. 1, Layer 14.

4. Fragment of a bowl, with a wide mouth and flaring sides and slightly everted, rounded rim, which is internally sloping. Tr. 1, Layer 13.

5. Fragment of bowl with almost straight sides and flattened rim which is beaded in ; burnished red surface. Tr. 1, Layer 14.

6. Fragment of a squat bowl, with a wide mouth, convex body, everted rim ; slightly burnished. Tr. 1, Layer 10.

7. Fragment of a small vessel with a concave neck and out-curved, rounded rim ; well burnished. Tr. 1, Layer 13.

8. Fragment of a vessel with, out-turned rounded rim, and convex sides ; appears to have had a wide mouth. Tr. 1, Layer 10.

9. Fragment of a small bowl with convex sides, out-turned rim, making a concave depression on the exterior, highly burnished blotchy brown surface. Tr. 1, Layer 14.

10. Fragment of a shallow platter with thickened, flattened rim, which makes a triangular section ; highly burnished, reddish brown blotchy surface. Tr. 1, Layer 10.

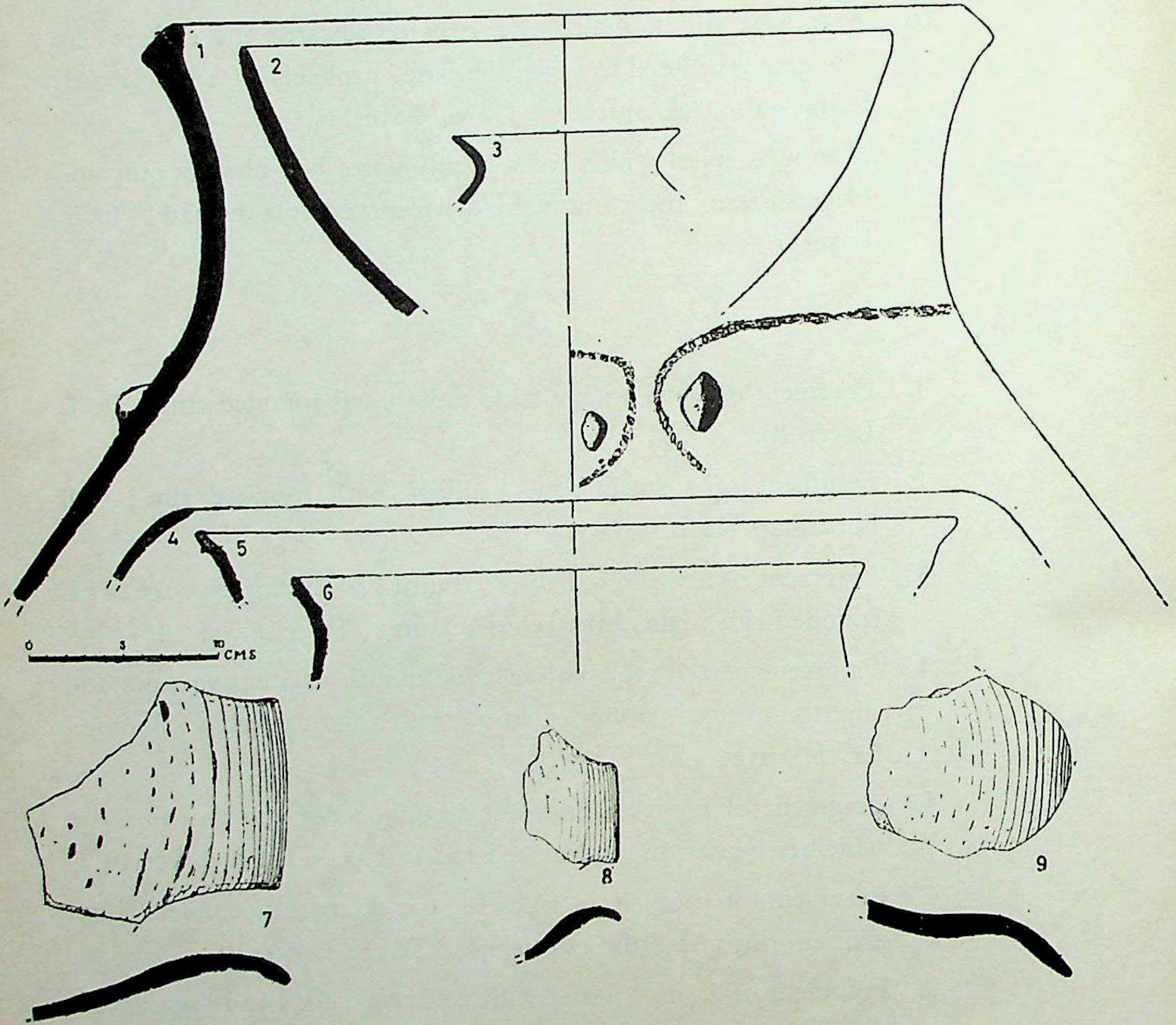
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FIG. 14. Coarse Grey Ware 1-6 ; Lipped Bowls 7-9.

11. Rim fragment of an urn with funnel-shaped mouth and featureless rim. Tr. 1, Layer 10.
12. Neck fragment of a burnished brown vessel, with constricted neck and flaring sides ; the interior is coarse black, while the exterior is burnished brown. Tr. 1, Layer 9.
13. Fragment of a globular vessel, with constricted neck, flaring out rim which is rounded. Tr. 1, Layer 10.
14. Base fragment of a squat dish-on-stand ; both the interior and exterior of the base are burnished. Tr. 1, Layer 4 (overlap phase).

Dishes-on-stand occur in the neolithic levels at Brahmagiri (Wheeler, 1948, p. 231, fig. 23, T. 74). The shape continues in the megalithic fabrics, as evidenced at Brahmagiri (Wheeler, 1948, p. 218, fig. 14, p. 12), Maski (Thapar, 1957, p. 52, fig. 14, B (i) 5 & B (i) 6), and Tekkalakota (Nagaraja Rao & Malhotra, 1965, fig. 17g).

15. Base fragment of a dish-on-stand with flaring sides, rounded edge, grooved at the top ; burnished dull red surface. Tr. 1, Layer 4 (overlap phase).
16. Base fragment of a *'Kunda'* type vessel with flat base, and convex sides ; burnished blotchy surface. Tr. 1, Layer 10.
    Analogous vessels occur in grey wares in many sites of the Deccan *cf.* Nevasa, fig. 94, T. 10, 10b; fig. 95, T 10d and 10e (Sankalia, *et al.*, 1960).

Burnished grey–ochre painted variety

Except that the rim or the interior of vessels are decorated with a post-firing red ochre, this variety does not show any remarkable types. A few examples are illustrated.

Fig. 12

11. Fragment of a bowl with a short channel spout; rim is painted with red ochre : Tr. 1, Layer 4.
12. Rim fragment of a bowl with flaring sides and beaded in rim ; the edge is painted with ochre. Tr. 1, Layer 14.

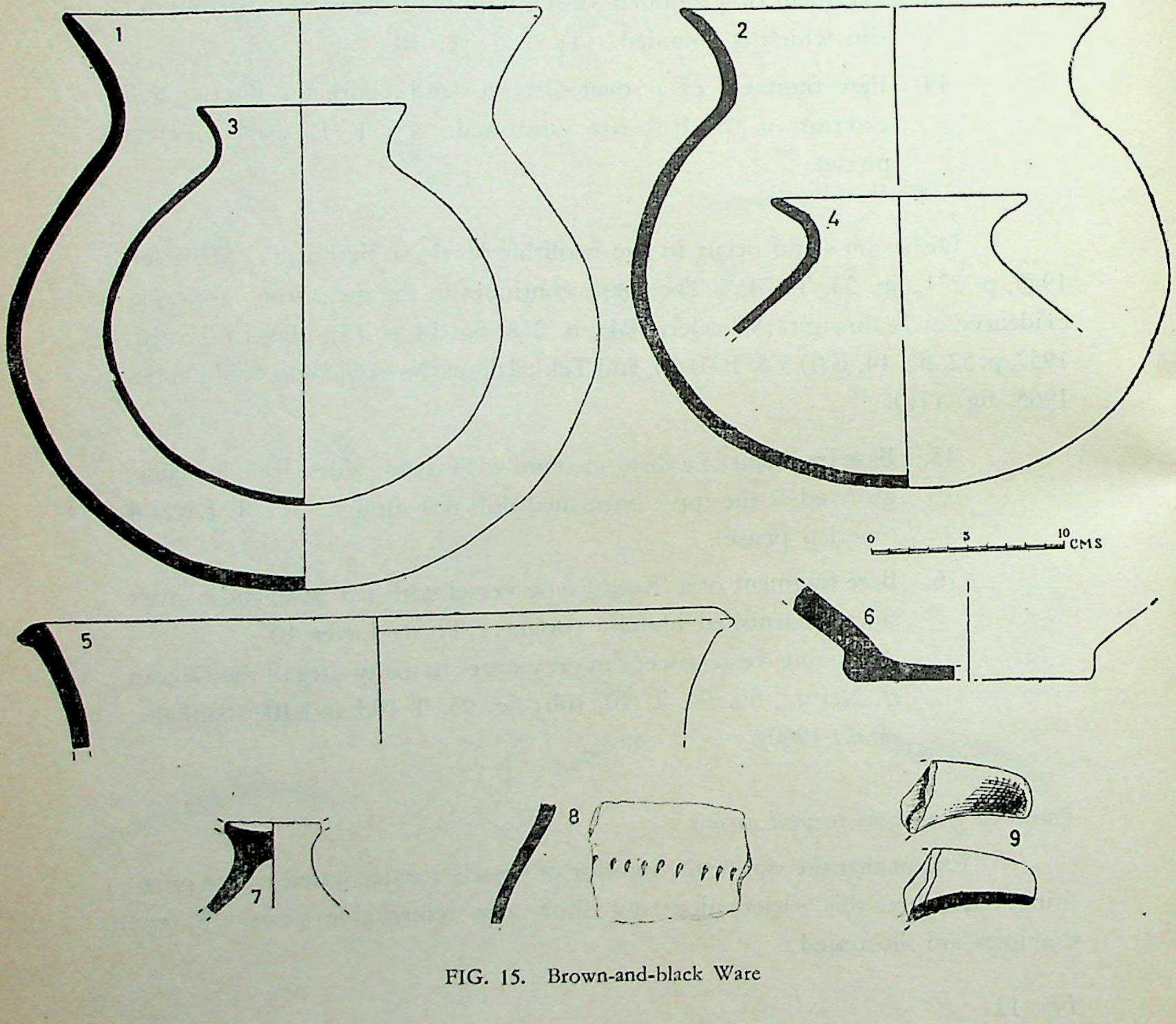
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FIG. 15. Brown-and-black Ware

13. Neck fragment of a vessel with constricted out-turned rim ; painted with red ochre at the rim, and the neck on the inner side. Tr. 1, Layer 10.

14. Fragment of a squat vessel with concave neck, everted rounded rim, painted with red ochre ; on the shoulder is found probably an animal or a festoon drawn with red ochre. Tr. 1, Layer 12.

15. A small cup, with short, concave neck, everted, rounded rim and a squat body ; the exterior is well burnished. Red ochre is smeared all over the interior. This was found placed within the western pot of the child burial No. 1, sealed by Layer 9 (Pl. IVB. 5).

Coarse grey ware

Besides the pale grey and the burnished grey ware, a small quantity of a coarse grey ware also occurs in the two neolithic phases of the site. The fabric varies from greyish black to coarse brown texture. Most of the vessels of this group show roughened surface.

The types are again vessels and bowls, the latter with lugs. Large storage jars are also found. The following specimens are illustrated :

Fig. 14

1. Shoulder and neck part of a huge jar, with almost straight sides, and thickened and flattened rim. On the shoulder is a thin applique band pasted horizontally and incised at regular intervals, giving a rope pattern, which terminates with curved ends in opposite directions ; within the curved ends are two applique knobs; of coarse, unburnished grey fabric; from a pit on the slope of the mound near the river bank.

As already referred, such huge jars were used in multiple pot burials at Nevasa (*IAR*, 1959-60, pl. XXX B) and Tekkalakota (Nagaraja Rao & Malhotra, 1965, pl. XIV and p. 96). They show such applique decorations. It is surmised that such applique knobs associated with burial jar, might represent the nipples of the mother, as already indicated (*supra* p. 36).

3. Neck fragment of a small vessel with concave neck, everted rounded rim ; unburnished, dull red fabric. Tr. 1, Layer 12.

6. Fragment of a vessel with flaring sides, rounded rim; the exterior is coarse blackish grey while the interior is slightly burnished. Tr. 1, Layer 14.
2. Fragment of a large bowl with concave sides, and rounded rim ; coarse red fabric, which is rusticated ; the interior is encrusted with lime. Tr. 1, Layer 12.
4. Fragment of a shallow bowl with a wide-mouth with in-curved, almost flattened rim and having coarse surface ; the interior shows rustication by grass or rags. Tr. 1, Layer 14.
5. Fragment of a bowl with a wide mouth, flaring sides, and a ledge ; exterior surface roughened and the interior slightly burnished. Tr. 1, Layer 14.
7. Fragment of a bowl with flaring out, squarish lug ; of coarse red fabric ; surface roughened. Tr. 1, Layer 5 (overlap phase).

Such lug-handled vessels occur from the lowest stratum of the site, and in considerably large quantity. Analogous lug-handled vessels are found at Brahmagiri (Wheeler, 1948, fig. 23. T77, p. 231), Maski (Thapar, 1957, fig. 10, 2e, p. 42), Sangankallu (Subbarao, 1948, p. 17, pl. VIII, XV c & XV d), Piklihal (Allchin, 1960, Pl. 33, Types 60-61) and T. Narsipur.[1] As at Hallur the last mentioned site has yielded a large quantity of such lug-handled pottery.

8. Fragment of a bowl with an out-curved lug which is rectangular at the end ; of coarse red fabric. Tr. 1, Layer 7.
9. Fragment of a bowl with an out-curved lug, the end of which is rounded ; surface roughened ; of coarse grey fabric. Tr. 1, Layer 14.

Brown-and-black ware

This is the major ware of phase 2 of period I. It is generally found in coarse fabric. As already mentioned, the fabric displays a degeneration in the potting tradition. The clay used is coarser than that of the wares of the earlier phase. The most common types are globular vessels of varying dimensions and bowls. The following examples are illustrated.

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[1] Unpublished. From a personal study of pottery, with the permission of Dr. Seshadri, the excavator.

Fig. 15

1. A globular vessel with concave neck and flaring sides ; unburnished, brown-and-black surface.

This is used as a burial urn, in the child burial, Tr. 1, sealed by Layer 9. It was found on the eastern end of the burial pit No. 1 and contained fragments of skull, etc., as the teeth were recovered from within (Pl. IVB, 1).

2. A smaller vessel, similar to the above, used in the child burial No. 1 as the pot at the western end of the burial pit ; it contained the lower extremities of a child (Pl. IVB, 2).
3. A globular vessel with a short concave neck, everted, rounded rim, and a globular body ; the exterior shows smoothening by hands ; it was found covered with a bowl of black-and-red ware (fig. 17, No. 1) in a pit sealed by Layer 5 (of overlap phase) indicating a true overlap (Pl. VI c, 1-2).
4. Fragment of a globular vessel with concave neck, sloping shoulder, and out-curved, rounded rim; the exterior is coarse brown, while the interior is black. Tr. 1, Layer 5.
5. Fragment of a vessel with flaring sides and flattened rim which has ledged-out ; of coarse brown fabric. Tr. 1, Layer 6.
6. Base fragment of a thick jar, of coarse red fabric ; the disc base has impressions of a fine reed mat (Pl. VIA, 1). Tr. 1, Layer 7.

Mat impressions at the base of the pots are found in several sites. The bases of two huge jars used in the multiple pot burial at Tekkalakota, and another example from Burzahom, show such impressions. One more example from Bellary, now in the Pitt-Rivers Museum at Oxford, is referred to by Allchin (1960, p. 135).

It is interesting to notice the part played by environment in these examples. Around Tekkalakota, in Bellary District, date-palm trees are in plenty, and therefore, the neolithic hilldweller made mats of date-palm leaves. At Hallur, however, date-palm is scarce, while fine reeds grow on the river banks. Naturally the neolithic inhabitant made here mats of reeds.

Further, the occurrence of mat impressions at the base could be explained as follows. Such impressions are found generally at the bases of huge jars. The potter appears to have made the jars by building method (*i.e.*, coiling the clay, and then moulding the jar). This he made on mats, instead of directly on the ground. Thus the impressions of the mats naturally occurred on the bases.

7. Fragment of a dish-on-stand with a hollow base ; the exterior and the interior of the hollow is red, while the interior of the dish is black ; Tr. 1, Layer 5.
8. Shoulder fragment of a globular vessel with a roughened surface, due to the impressions probably of grass, on both the sides ; the shoulder is decorated with incised decoration. Tr. 1, Layer 5.
9. Fragment of a channel spout, with narrow mouth, probably attached to a bowl. Tr. 1, Layer 4.

The specimen compares in shape very well with the specimens from Navdatoli (Sankalia *et al.*, 1958, fig. 44, T. 72). The latter are painted examples.

Ochre painted variety

A few examples of brown-and-black ware with ochre paintings also occur. They are illustrated.

Fig. 16

1. Large bowl, of coarse brown-and-black ware with a blotchy surface, and having a circular hole at the centre of the bottom. The interior is decorated with thick dots at close intervals. The pigment used is red ochre, which looks black, on black blotchy surface (Pl. V c).

The decoration and the hole at the centre show that the bowl probably had some magical or religious significance. It may also have been used as a lid, and the hole at centre may have been meant to facilitate easy handling.

The only comparable bowl comes from Tepe Gawra in northern Mesopotamia (Tobler, A. J., 1950, pp. 155-56, pl. LXXX c). This bowl found in Stratum IX, ascribed to C. 3100 B.C. (Porada, E., 1965, chart on p. 177), is made of grey ware and the entire interior is painted with circular dots of dark brownish-red paint, almost similar to the Hallur example. A number of terracotta animals are attached in the interior in a semicircle. One of them is a ram.

The excavator feels that this decoration indicates an artistic expression on the part of the potter, rather than any ritual idea.

2. Shoulder fragment of a coarse, brown ware pot with roughened surface ; on the shoulder, near the neck is found what looks like a goad with a dot above, effected with a red pigment.
3. Sherd of a brown-and-black ware, of coarse fabric ; decorated with double diamond design executed with thick bands of ochre (Pl. VIA, 8).

Painted Black-on-red ware

This ware, quite distinct from the painted ware of phase 1, is comparable to the Jorwe painted ware. It is made of comparatively fine clay and well fired, giving a metallic ring. It is wheel-turned. The rim and exterior of the vessels are decorated with pre-firing black painted designs. The ware is sparse. But its advent in phase 2 in association with copper and stone blade industry, is taken to indicate the arrival of (or contact with) a new wave of the chalcolithic folk from the northern Deccan.

The following specimens are illustrated.

Fig. 16

4. Fragment of a globular vessel with a short, but straight neck and beaded out rim ; of red ware fabric ; well fired and produces a metallic ring ; the exterior is decorated with pre-firing black paintings ; around the neck are two thick bands. On the shoulder appears to be a double-diamond pattern of two bands, interspersed with two goads drawn in opposite directions (Pl. VIB). From a pit on the slope of the mound near the river bank.

Analogous shapes come from Piklihal (Allchin, 1960, pl. 35, 13 & 15), Jorwe (Sankalia & Deo, 1955, fig. 61, 4), Nevasa (Sankalia *et al.*, 1960, fig. 90, T. 3) and Tekkalakota (Nagaraja Rao & Malhotra, 1965, fig. 20 h).

5. Sherd of coarse brown-and-black ware, having regular concentric striation marks on the interior ; the dull brown exterior is decorated with groups of curvilinear bands in black. Tr. 1, Layer 5.
6. Sherd of a body portion of a pot of red ware ; wheel made; the exterior is painted with a horizontal band to which join a group of four oblique strokes (Pl. VIA, 4). Tr. 1, Layer 7.

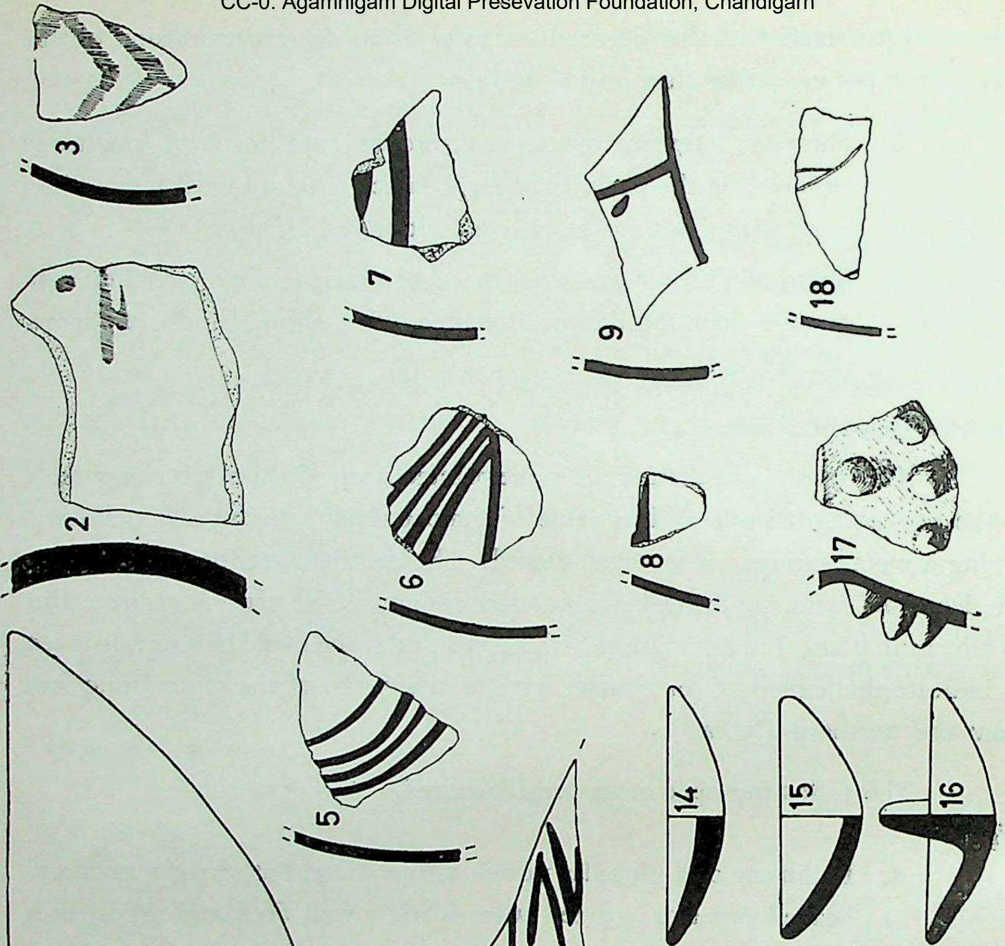
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FIG. 16. Brown-&-black ware, ochre painted, 1–3; Painted black-on-red ware (Jorwe type) 4–9; Lids 10–16.; applique decorated 17; incised graffiti 11.

7. Sherd of red ware with black exterior. The interior red surface is painted with two thick bands in black (Pl. VIA, 5). Tr. 2, Layer 8.
8. Sherd of coarse red ware with a thick black band on the exterior (Pl. VIA, 7). Tr. 1. Layer 4.
9. Sherd of dull red ware, painted with a horizontal band, and a vertical band which is indented with a thick stroke (Pl. VIA, 6). Tr. 1, Layer 6.

Other decorated sherds

Fig. 16

17. Shoulder of a small vessel of brown-and-black ware ; decorated on the shoulder with 4 applique knobs (Pl. VIA, 2). Tr. 1, Layer 8. *cf.* PKL, p. 44, pl. 28, T. 43.
18. Sherd of a coarse red pot with incised graffiti mark, only a part of which is seen (Pl. VIA, 3). Tr. 1, Layer 4. Appears to be of Iron Age.

Lids

As many as 15 lids have been recovered from the excavated trenches. Though the number of lids is not vast enough to trace an evolution in the forms, it appears that simple cake-like lids occur in the early levels, while the later ones show either finger pressed depressions or knobs to facilitate holding. Even in fabric, the earlier ones are of coarse grey or burnished grey wares, while in the upper levels, lids are of red ware. The following specimens are illustrated.

Fig. 16

12. Fragment of a lid, a simple cake of terracotta, with a flat top and convex base; coarse brownish grey texture (Pl. XIIIB, 1). Tr. 1, Layer 13.
13. Fragment of a lid with a flat base, and possibly having a curved knob at the top, as the remnants of the one end of the knob show; hand made; burnished blotchy grey (Pl. XIIIB, 5). Tr. 1, Layer 7. *cf.* PKL, pl. 28, 40 b.
14. A disc-shaped lid, with shallow concave top and convex base; slightly burnished. Tr. 1, Layer 7 (Pl. XIIIB, 2).

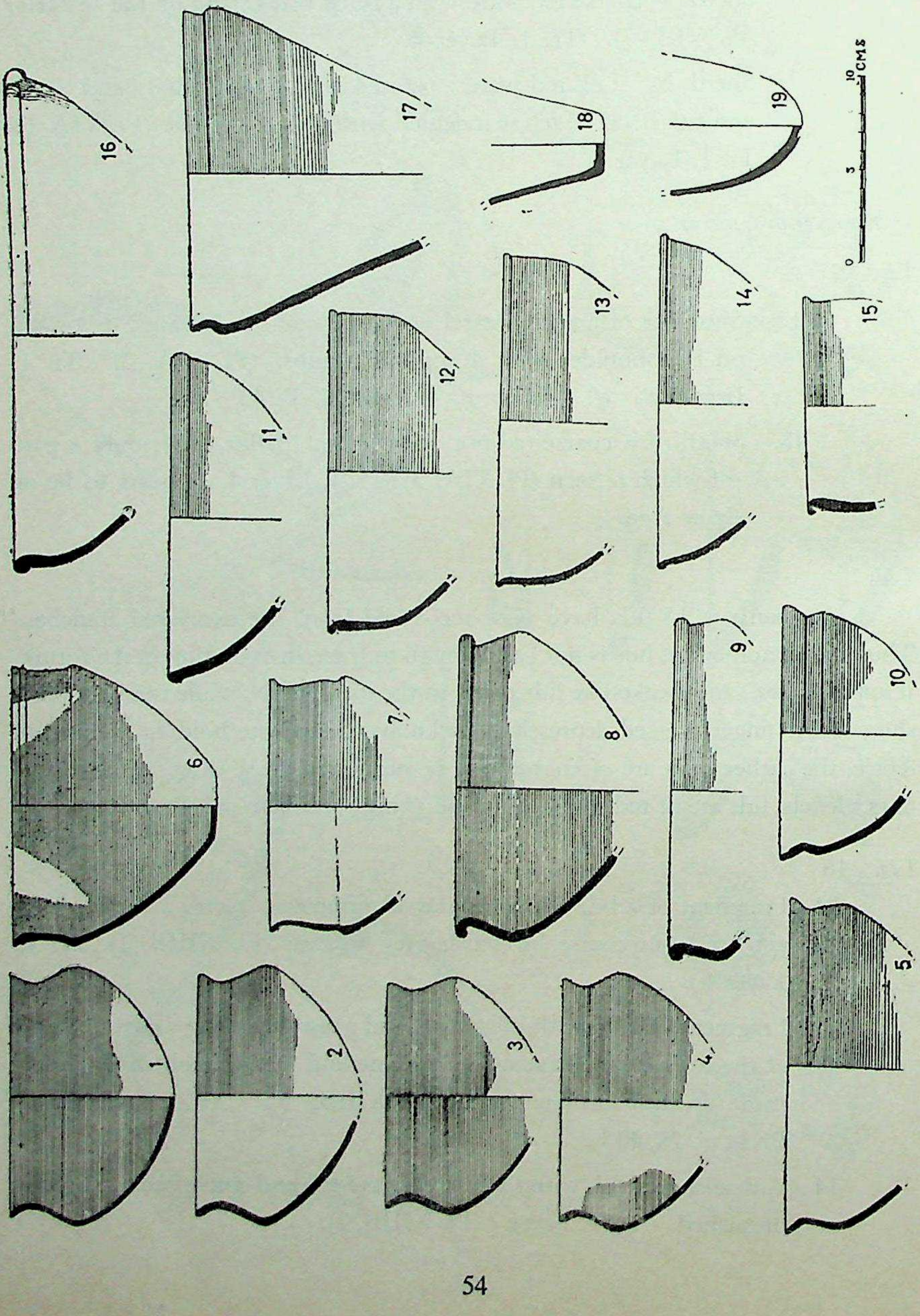
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FIG. 17. Black-and-red ware (Early Iron Age).

15. Looks like a small shallow bowl with deep concave top resulting in a prominent convex base; used as a lid; slightly burnished. Tr. 1, Layer 6.

16. A circular lid, with a concave top and having an applied, short conical knob in the centre; hand made; of red fabric (Pl. XIIIB, 6). Tr. 1, pit sealed by Layer 10.

10. Small lid, with convex base and tapering top; a finger pressed depression on top is effected to facilitate holding; thumb pressed marks effected while moulding are seen in the lid; coarse black ware; surface find (Pl. XIIIB, 3).

11. Similar to the above, but slightly bigger; the peripheral edge is decorated with regularly effected depressions; of coarse brown-and-black ware (Pl. XIIIB, 4); surface find.

Period II. Early Iron Age or Megalithic

In the pottery recovered from the overlap phase of the neolithic-chalcolithic and iron age cultures, there are 3 principal wares, with two subsidiary varieties. They are: (1) Black-and-red ware; (1a) White painted black-and-red ware; (2) All black ware; (2a) White painted variety; and (3) Red ware.

Unlike the neolithic wares, the pottery of the Iron Age is wheel made, and show a highly burnished surface, particularly the first two wares with their painted varieties.

Black-and-red ware

Associated with the iron implements, this ware is a distinctive megalithic ware, encountered in all the excavated sites of the region, such as Brahmagiri, Sanganakal, Maski, etc. It has a highly burnished and polished surface. Generally it is made of a fine paste, and is thin in section. The black interior and the black-and-red exterior shows the use of inverted-firing technique in baking the pottery. Among the shapes, bowls of various sizes are the predominant types. The typical conical bowl or lid also occurs.

The following selected types are illustrated:

Fig. 17

1. Bowl with concave sides, slightly out-turned rim, carinated shoulder, and rounded base; found in a pit covering a neolithic pot (Pl. VI c, 1). Tr. 1, pit sealed by Layer 5.

2. Bowl with slightly everted, rounded rim, bluntly carinated shoulder, and rounded base. Tr. 1, pit sealed by Layer 5.
   Comparable type occurs in an extended burial at Tekkalakota. *cf.* TKT. fig. 23 b, e.

3. } Similar to the above.
4. } From the same pit sealed by Layer 5.

5. A small deep bowl with short concave sides, flaring-out round rim, tapering towards a rounded base; of thin section. Tr. 1, Layer 4.

6. Bowl with thin sides, everted rim which is sloping internally and grooved externally; ledged shoulder, and tapering towards the base like a funnel-shaped bowl, and having a flattened base (Pl. VID, 3). Tr. 1, Layer 4. *cf.* SGK, Pl. V, Type Ib, P. 12; MSK, Fig. 17B (II) 9 a and B (II) 3.

7. Small bowl with out-turned, rounded rim, slightly bulging out, vertical sides with a ledge on the body and a corresponding depression in the interior; tending towards a rounded base. Tr. 1, Layer 4. *cf.* BR, Fig. 11 c roughly corresponds to this as far as the sides are concerned.

8. Fragment of a bowl with a wide mouth, out-curved beaked rim, bluntly carinated shoulder and tending towards a rounded base; exterior well polished and the interior roughened. Tr. 1. Pit sealed by Layer 5. *cf.* BR, Fig. 17, T. 9.

9. Fragment of a carinated bowl with straight sides and beaded out, undercut rim. Tr. 1, Layer 4. *cf.* BR, Fig. 14, P.10a; MSK, Fig. 21, B (v) 1.

10. Similar to No. 5 described above. Tr. 1, Layer 4.

11. Fragment of a shallow bowl, with beaded out rim. Tr. 1, Layer 4.

12. Fragment of a carinated bowl, with straight sides, everted, rounded rim, having a groove on the exterior; tending towards a rounded base, below the carination. *cf.* BR, Fig. 13, P. 6a.

13. Fragment of a hemispherical bowl with straight sides with out-turned, rounded rim and a body. Tr. 1, Layer 4.
14. Fragment of a shallow bowl with a rounded rim and grooved at the exterior. Tr. 1, Layer 4.
15. Fragment of a small bowl with straight sides, out-turned, flattened rim, thick in section. Tr. 1. Layer 6.
16. Fragment of a bowl, with thick sides, rounded rim, grooved on the exterior; the rim is pinched at one place, to make a short channel spout. Tr. 1, Layer 6. This type also occurs in the neolithic wares as already mentioned.
17. Fragment of a conical bowl or lid with a concave and everted rim, tapering body, tending towards a rounded base. Tr. 1, Layer 3. *cf.* BR, Fig. 13, P. 5; MSK, Fig. 23, No. 23.
18. Basal end of a funnel-shaped bowl with flat base; burnished red exterior and unburnished black interior. Tr. 1, Layer 3. *cf.* MSK, Fig. 23, No. 24.
19. Basal end of a conical bowl with a rounded bottom; polished sepia exterior and coarse interior. *cf.* BR, Fig. 24, T. 98, 98; MSK, Fig. 33, No. 26.

The northernmost site, which has yielded such typical shapes of Iron Age black-and-red ware, is Ranjala in Khandesh of Maharashtra (*IAR,* 1960-61, p. 26 and pl. XXXIII B).

White painted black-and-red ware

The fabric is the same as the one described above with the additional feature of being decorated with post-firing white paintings drawn on both the interior and exterior surfaces of the vassels. The painted designs consist of groups of vertical and oblique strokes. Groups of six or seven lines are common. The lines drawn compare remarkably with any line drawn with a brush. The paintings are faint and are visible only when they are tilted in such a way that light falls on the painted area. The shapes of the vessels are typical of the Iron Age, consisting of bowls, tulip-shaped vessels and conical vessels.

When the ware was first noticed at the site, during the surface explorations, the author thought that they probably belonged to the pre-Iron Age chalcolithic phase (Nagaraja Rao, 1964, p. 61). For white painted black-and-red ware formed one of the chief ceramics of the chalcolithic sites of Ahar, Gilund and other sites in Rajasthan, Nagda and Navdatoli in Central India, and also occurred at Prakash and Tekwada in Maharashtra. Except the few painted sherds said to be of megalithic phase, exhibited in the Madras Museum, from Perumbair and Madura, reported by Subbarao (1958, p. 176 and fig. 43),[1] and a typical 'cup' of early black-and-red ware with white painted decorations from the earlier excavations at Maski, reported by Allchin (1960, p. 65), no white painted black-and-red ware is associated with the megalithic or Iron Age period. But the shapes at Hallur intrigued the author as they were typically of Iron Age graves. Therefore, only a knowledge of the stratigraphic position of this ware could solve the problem whether this is of chalcolithic or Iron Age.

The excavations have now definitely proved that this ware, found in the overlap phase in association with iron implements, and not in the earlier neolithic-chalcolithic phase, belongs to the iron-using people who arrived in this site by about B.C. 1000. This is further confirmed by the occurrence of white painted black-and-red ware in the overlap phase at Sanganakallu, in the recent excavations. Fragment of a globular vessel from this site has seven strokes which form a zig-zag round the neck. To the lower ends of these strokes, groups of three oblique strokes are painted transversely (Ansari & Nagaraja Rao; 1969, p. 23, Fig. 12A, No. 74). Incidentally it may be mentioned that similar white painted black-and-red ware and all black ware have been reported from the megalithic site of T. Kallupatti in Madurai District, Madras State (*IAR*, 1960-61, p. 18, Pl. XXX B).

Attention here must be drawn to the white painted black-and-red ware bowls found in a neolithic burial at Tekkalakota (Nagaraja Rao & Malhotra, 1965, Pl. Vb; fig. 23 a, p. 54) and Tekwada (*IAR*, 1956-57, pp. 18-19, and Fig. 8, No. 3). At the former site, black-and-red ware was exclusively associated with the burials. The author has indicated there (Nagaraja Rao & Malhotra, 1965, p. 51) that the black-and-red ware associated with the burials is probably an imported ware. With the evidence of the white painted black-and-red ware at Hallur, this suggestion gains ground and indicates that this ware, associated with the Iron Age people, might have been borrowed from them by the neolithic-chalcolithic folk who came into contact with them by then. The dating of the Iron Age phase at Hallur to circa B.C. 1000 is significant in this context. Further the typical megalithic black-and-red ware vessels recovered from Ranjala in Khandesh (*IAR*, 1960-61, p. 26), indicate the possible extension of the Iron Age culture in the north. This again poses a question whether the chalcolithic folk of Bahal-Tekwada, also in Khandesh, came into contact with the early iron-using people who seem to have extended their culture so far north, as seen from the Ranjala evidence, and borrowed their pottery for sepulchral use. Here again, the dating of Iron Age phase to B.C. 1000 is significant. However, more field work and extended excavations are necessary before passing conclusive remarks on the question. Here only the possibilities are suggested.

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[1] Shri K. V. Raman of the Archaelogical Survey of India who surveyed the region intimates me that these are wrongly labelled as belonging to Perumbair. They are said actually to have come from the site T. Kallupatti, where Shri Raman collected more painted black-and-red ware pottery.

Selected specimens of the white painted black-and-red ware are illustrated here.

Fig. 18

1. Bowl with concave side, everted, beaded out, under-cut rim, bluntly carinated shoulder, and a rounded base; the interior is painted in white with long oblique strokes emanating from the centre. Tr. 1, Layer 3. (Pl. VID, 2).
2. Bowl with an everted rim and grooved exterior, constricted concave neck, bluntly carinated shoulder and saggering base; painted in white with groups of 5 long strokes at intervals in the interior and groups of five short strokes at the inner rim. Tr. 1, Layer 3 (Pl. VID, 1).
3. Fragment of a carinated squat vessel with a broad mouth; beaded out, under-cut rim; painted in the interior with groups of six vertical bands drawn at intervals. Tr. 1, Layer 4.
4. Fragment of a squat vessel with weakly carinated body, beaked out rim which is undercut; painted in white both in the interior and exterior; on the exterior, groups of four (or more) oblique strokes; in the interior, groups of four or more vertical strokes drawn at the neck and in the inner side. Tr. 1, Layer 5.
5. Neck fragment of a small vase with a grooved rim; short concave neck and probably a squat body; painted on the shoulder with groups of 7 oblique strokes. Tr. 2, Layer 3.

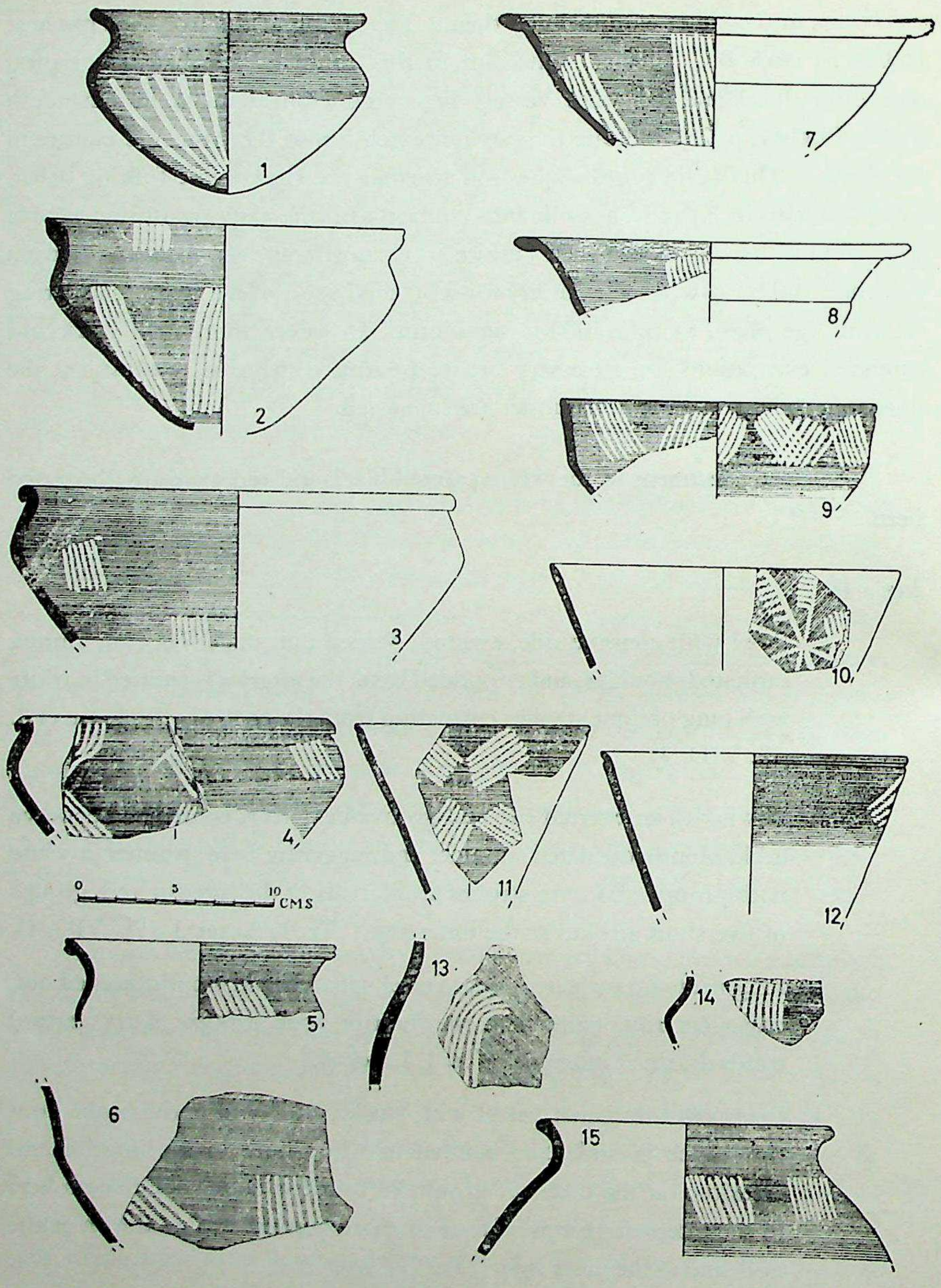
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FIG. 18. White painted black-and-red ware (Early Iron Age).

6. Shoulder fragment of a tulip-shaped bowl with a ledge on the exterior and a corresponding groove in the interior; painted in white with groups of seven vertical bands drawn obliquely at intervals. Tr. 1, Layer 3 (Pl. VIIA, 5).

7. Fragment of a tulip-shaped bowl with a flaring and everted rim which is completely elliptical, undercut on the exterior ; painted in white with groups of 9 (or more) bands in the interior. Tr. 1, Layer 3.

8. Fragment of a tulip-shaped, shallow bowl with flaring and everted rim which is completely elliptical and undercut on the exterior; a ledge on the exterior, with a corresponding depression in the interior; very highly burnished; painted in white in the inner part of the rim with groups of (9 or more) oblique bands. Tr. 1, Layer 3 (Pl. VIIA, 1). *cf.* BR, Fig. 14, p. 11 (but without paintings); MSK, Fig. 18, B (iii) 5 a & 5 b (but without paintings). This shape is very common in the Iron Age levels of the region. Wheeler (1948, p. 215) says that the occurrence of this general type in definite stratified levels of the habitation areas at Brahmagiri provides an important link between them and the megaliths. Further, at this juncture a doubt occurs whether the white paintings on these wares were unnoticed as they are not normally visible to the eye and washed off when cleaned in water. A re-examination of the ware from fresh excavations at Brahmagiri is, therefore, necessary.

9. Fragment of a straight-sided, weakly carinated bowl, with a slightly everted rounded rim, the exterior of which is grooved; painted in white both internally and externally with groups of six oblique strokes drawn in opposite directions, sometimes the ends joining and making a criss-cross pattern. Tr. 1, Layer 5 (Pl. VIIA, 6).

10. Rim fragment of a conical bowl or lid with straight sides, internally sloping rim; painted on the exterior with 4 vertical lines making a design of spokes of a wheel; the ends of these lines are indented with seven short strokes. Tr. 1, Layer 6 (Pl. VIIA, 4).

11. Fragment of a conical bowl or a lid with straight sides, rounded rim, externally grooved, burnished surface; painted on the exterior with groups of seven oblique strokes drawn in opposite directions, and probably in more than one row. Tr. 1, Layer 6 (Pl. VIIA, 3).

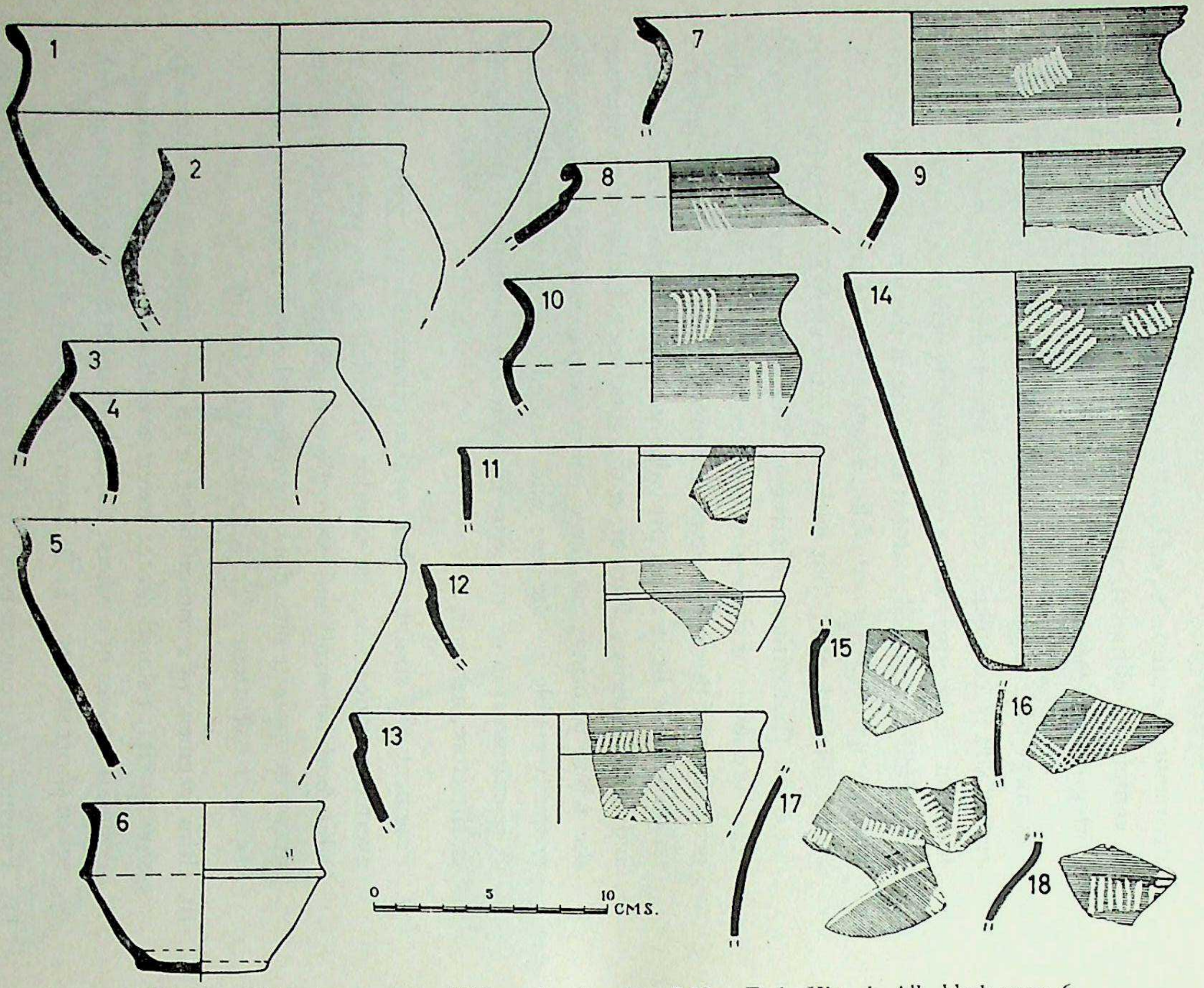
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FIG. 19. All black ware 1–5; White painted variety 7-18; Early Historic All black ware 6.

12. Rim fragment of a funnel-shaped conical bowl or lid, rounded rim and grooved exterior, painted with groups of 4 or 5 oblique strokes. Tr. 1, Layer 5.
13. A thick sherd of a vessel with brownish red exterior and grey black interior showing regular striation marks; the interior of the neck part is burnished; on the exterior, a curvilinear design to make a square or rectangular pattern, is drawn with 5 bands drawn in white. Tr. 1, Layer 3.
14. Shoulder fragment of a small bowl, with concave neck and a groove on the shoulder; painted with groups of 8 vertical bands on the shoulder, probably at intervals. Tr. 1, Layer 3 (Pl. VIIA, 2).
15. Upper part of a small globular vessel with a concave neck; out-curved, rounded rim; sloping shoulder with a groove on the rim; painted with groups of seven oblique bands drawn at intervals, in opposite directions. Tr. 1, Layer 3.

All black ware.[1]

Except that the surface of this ware is black, there is no discernable difference between this ware and the black-and-red ware. It is of the same fabric, with highly burnished and polished surface; and of thin core. The same shapes continue, and a white painted variety is also found. The following types are illustrated.

Fig. 19

1. Fragment of concave sided, carinated bowl, with an out-curved beaded rim. Tr. 2, Layer 4.
2. Fragment of a small vessel with a weak concavity at the neck, and almost straight, but short, rounded rim; sloping shoulder, and having a weak carination at the body, which tends toward a rounded base. Tr. 2, Layer 4.

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[1] Although originally All Black Ware was classified as a separate ware, on reflection and discussion with Dr. Allchin, it is now clear that this is really to be classed as black-and-red ware, the black-and-red effect being the result of the conditions of firing. However, the original classification has not been altered, as separate illustrations have been prepared for the wares, and changing the classification would cause confusion.

3. Fragment of a small vessel, with an out-curved rounded rim; and sloping shoulders; exterior is well burnished and the interior, only up to the rim. Tr. 2, Layer 4.

4. Neck fragment of a vessel with concave neck, out-turned, rounded rim. Tr. 2, Layer 4.

5. Fragment of a funnel-shaped deep bowl or lid with concave neck, out-curved, rounded rim, and tending towards, probably, a rounded base; Tr. 1, Layer 3. *cf.* BR, Fig. 25, T. 111; MSK, Fg. 21, B(v)3, and 22, No. 17.

White painted all black ware

Fig. 19

7. Fragment of a vessel with a wide mouth, everted rim with a deep groove; concave neck and a groove on the shoulder; well burnished; painted in white with groups of 8 short, curvilinear strokes. Tr. 1, Layer 3.

8. Fragment of a neckless vessel with beaked out, under-cut rim; there is a ledge below the rim and a corresponding depression on the interior; exterior well burnished and the interior coarse; painted with groups of four vertical thin lines on the shoulder. Tr. 2, Layer 4.

9. Fragment of a vessel, with constricted neck, and short, flaring out rounded rim; burnishing found on the exterior and only up to the neck in the interior; painted in white with groups of 7 (or more) oblique strokes on the exterior. Tr. 1, Layer 3.

10. Fragment of a squat vessel with concave neck, out-curved rounded rim; grooved shoulder and probably tending towards a rounded base; painted in white on the concave neck, with a series of vertical, thin bands. Tr. 1, Layer 3.

11. Rim fragment of a straight-sided deep bowl, with a slightly everted, externally grooved rim; painted in white with groups of 10 (or more) oblique bands. Tr. 1, Layer 3

12. Rim fragment of a small bowl, with flaring sides and rounded rim, ledged on the shoulder; painted in white with groups of 8 (or more) oblique lines. Tr. 1, Layer 3.

13. Fragment of a conical bowl or lid with an everted, rounded rim and ledged shoulder; painted in white, with groups of 10 oblique bands drawn in opposite directions, and short strokes drawn above the ledge.

14. Part of a conical bowl, highly burnished, with straight sides, tapering towards a narrow, circular flat base; the rim is thin and externally grooved; interior unburnished. Painted on the exterior, near the rim with groups of 8 oblique strokes, drawn at intervals. Tr. 1, Layer 3 (Pl. VIIB). Analogous types but with concavity near the rim occur at various sites of the region. *cf.* MSK, Fig. 18, B (iii) 4; Fig. 21, B (v) 2; and Fig. 23, T. 23.

16. Possibly shoulder fragment of a vessel with highly burnished surface. The interior is painted with groups of eight oblique long strokes, drawn in opposite directions in such a way that the ends meet to make a lattice pattern. Tr. 1, Layer 5.

17. Shoulder fragment of a globular vessel, with a highly burnished and coarse interior, showing concentric striation marks. The exterior is painted with bands, in white, originating at one point and going towards all directions; each of these bands is indented to the right, with groups of eleven strokes. Tr. 1, Layer 3.

18. Shoulder fragment of a small vessel, with burnished exterior and unburnished interior, showing regular striation marks; painted in white with groups of 6 oblique strokes towards left and right. Surface find.

Red Ware

Compared to the other wares already described, Red ware occurs in a small quantity. It is of medium fabric and not well fired. A slip is applied over the surface, and slight polish is observed.

The following types are illustrated.

Fig. 21

1. Neck fragment of a globular vessel with a concave neck, out-turned rim, which is grooved on the exterior and divided into two parts; the lower part is decorated with incised oblique strokes giving a rope-like design; the expanding shoulder has concentric grooves and incised oblique strokes. Tr. 1, Layer 3.

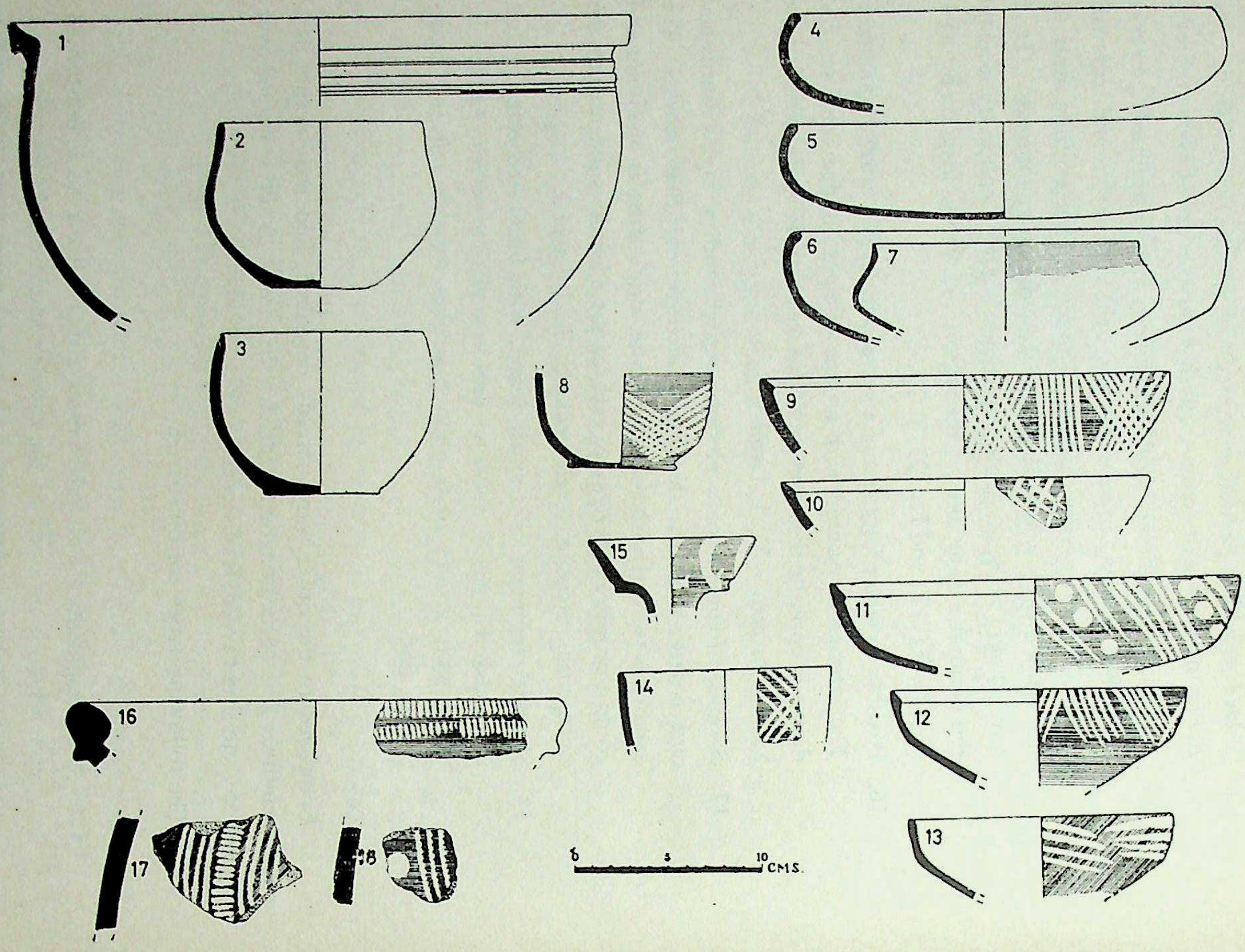
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FIG. 20. Black-and-red ware, Early Historic 1-7 ; Russet-coated painted ware 8-18.

2. Fragment of a globular vessel, with a weak, concave neck, slightly everted rim, flattened at the top and internally grooved; it has a ledge on the exterior which is decorated with incised, slanting strokes giving a rope design. Tr. 1, Layer 5.

3. Neck fragment of a squat vessel with a broad mouth and a concave neck, out-turned, flattened rim, which is grooved on the exterior; the red slip is seen on the exterior and upto the neck in the interior. Tr. 1, Layer 3.

4. Neck fragment of a vessel, with a short, straight neck, having a thick, beaded out rim, with an internal groove. Surface is treated with a dull red slip. Tr. 1, Layer 5.

5. Neck fragment of a globular vessel with concave neck out-curved, rounded rim which is slightly pressed underneath; a red slip is seen on the exterior and up to the neck in the interior from the rim. Tr. 2, Layer 4.

6. Fragment of a globular jar, with a concave neck, out-turned rim, rounded on the inner side; red slip applied on the surface.

7. Neck fragment of a globular vessel, with a short, but straight neck, and beaded out rim; the surface is treated with a red slip. Tr. 1, Layer 4.

8. Small vessel with constricted neck, everted rounded rim, with a groove on the exterior, bluntly carinated shoulder, and rounded base; red slipped surface; burnished. Tr. 1, Layer 1.

9. Fragment of a deep bowl, resembling a crucible, with short, concave neck; flaring rounded rim. It is of coarse red fabric. No polish or slip is seen. Tr. 1, Layer 4.

10. Fragment of a shallow platter with rounded edge. The surface is treated with red slip. Tr. 1, Layer 4.

11. Fragment of a shallow dish, with internally beaded rim which is undercut. The surface has red slip. Tr. 1, Layer 5.

12. Tulip-shaped concave-sided carinated shallow dish with out-turned rim, and burnished red surface. Tr. 1, Layer 1.

Early Historic Period Pottery

As already explained in the beginning of this section, there is no stratified debris of the early historic occupation. But a good quantity of pottery ascribable to this period has been recovered from the disturbed deposit of the top 1.5 m. Three main wares have been recognised, viz., the black-and-red ware, the russet-coated painted ware, and a red-slipped ware.

Black-and-red Ware

Unlike the black-and-red ware of the previous period, this ware is of thick section, and shows a crackled surface, usually explained as due to 'salt glazing'. But Allchin has rightly pointed out that this is not the case. He explains that the dressing applied to the ware probably "had a different rate of shrinkage to the body clay, and that this together perhaps with the presence of small quantities of organic matter, salt or other fluxes, under the typical firing conditions of a bonfire or at best 'village' pit kiln, in which the temperature rose at some stages too steeply, resulted in the crazing" or crackle (Allchin, 1960, pp. 66-67). Although the ware displays the use of the technique of inverted firing, the surfaces do not always show a black-and-red colour. In some cases, black-and-red colour is seen on both sides. The characteristic burnish and the high polish of the Iron Age black-and-red ware is absent in this fabric. The predominant types are the bowl and shallow dishes.

The following selected types are illustrated:

Fig. 20

1. Fragment of a large sized, squat pot or basin, with out-turned, under-cut rim, which has a sloping, grooved depression at the inner edge; below the rim are a few grooves. It is black and chocolate in colour and shows a crackled surface. Tr. 1, Layer 3.
2. Bowl with convex body, and very slightly incurved side, and a circular base around which is a groove, coarse surface with black patches; Tr. 1, pit sealed by Layer 3.
3. Similar to the above, but with a prominent groove around the base. Tr. 1, pit sealed by 3.
4. Shallow dish, with incurved sides, and rounded rim. Tr. 1, Layer 1. Analogous examples are of common occurrence in many early historic sites. *cf.* BR, Fig. 27, T. 129; Fig. 28, T. 141; MSK, Fig. 26, T. 66.

5. Similar to the above. Tr. 1. Layer 1.
6. Similar to No. 4 above, but with a carination on the exterior. Tr. 1, Layer 1. *cf.* BR, Fig. 17.
7. Fragment of a small dish with concave sides; out-curved, rounded rim and having a squat body. The surface shows crackling. Appears to be a survival from the megalithic shapes. Tr. 1, Layer 3. *cf.* MSK, Fig. 26, T. 5 b.

All black ware examples are rare. The only example appears to be a cup with everted, rounded rim, convex body, having a ledge at the middle part. It has a disc base. Tr. 1, Layer 3 (Fig. 19. No. 6).

Russet-Coated Painted Ware

This ware, wrongly called the 'Andhra Ware' for some time because of its association with the layers of Satavahana phase in many of the excavated early historic sites, occurs in quite considerable quantity. It is represented in both the red slipped ware and black-and-red ware. The latter is the same as the one described above. The paintings on this ware were first executed on the surface of the pots, which were coated again with a thin russet coloured substance, which preserved the painted designs. Quite a rich variety of patterns, essentially criss-cross, have been noticed. Although the upper strata of the site are disturbed and there is no firm cultural deposit of the early historic period, the available evidence is enough to show that there was a continuity of occupation from the Iron Age to the early historic period. This continuity is also indicated by the black-and-red ware of the early historic period which seems to have been derived from that of the early Iron Age. And the white painted ware appears to be the ancestor of the russet-coated painted ware just described.

The following selected specimens are illustrated:

Fig. 20

8. Fragment of a straight-sided bowl, of black-and-red ware, with a disc base; painted with criss-cross pattern, above the disc base. Tr. 1, Layer No. 1. *cf.* BR, Fig. 27, T. 130.
9. Shallow bowl with internally beaked rim, painted on the exterior with groups of criss-cross, 6 strokes, interspersed with groups of 6 vertical strokes. Tr. 1, Layer 1 (Pl. VII c, 4).

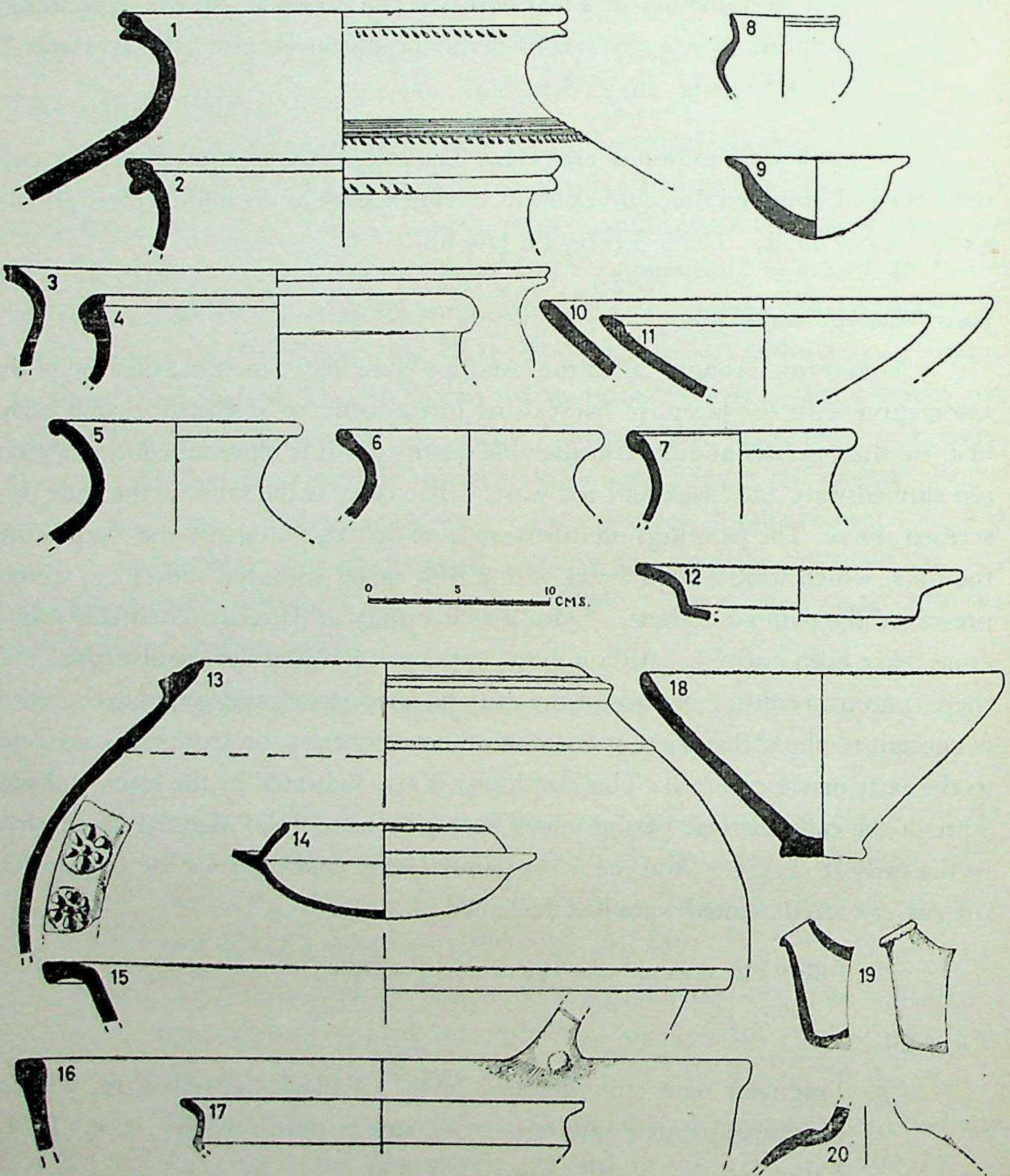
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FIG. 21. Red Slipped ware (Early Historic).

10. Rim fragment of a bowl of black-and-red ware with internally beaked rim; painted with criss-cross pattern. Tr. 1, Layer 1 (Pl. VII c, 8). *cf.* painted design to MSK, Fig. 25, No. 7.

11. Bluntly carinated shallow dish, of black-and-red ware, with an internally beaked rim; painted with groups of seven strokes, interspersed with three dots. Tr. 1, Layer 1 (Pl. VII c, 1). *cf.* BR, Fig. 27, T. 135 & Pl. C. XII 4; MSK, Fig. 25, No. 4; Pl. XX, B.5.

12. Bluntly carinated dish of black-and-red ware, with an internally beaked rim; painted with groups of oblique strokes on the exterior. Tr. 1, Layer 1 (Pl. VII c, 2).

13. Fragment of a shallow bowl with convex side, and rounded rim; horizontal bands are drawn on the exterior. Tr. 1, Layer 1 (Pl. VII c, 3). *cf.* MSK, Fig. 25, No. 5; pl. XX, B.7.

14. Fragment of a bowl with straight sides and rounded rim; painted on the exterior with criss-cross oblique strokes. Tr. 1, Layer 1 (Pl. VII c, 7).

15. Rim fragment of a vessel with narrow mouth, constricted neck, and probably a globular body; the mouth has slightly flaring sides, rounded edge, and a ledge on the exterior; painted with thick band. Tr. 1, Layer 1 (Pl. VII c, 6).

16. Rim fragment of globular vessel, of red ware, with a thick, rounded rim, having a ledge on the exterior. Groups of vertical strokes and indented short strokes are painted on the exterior of the rim. Tr. 1, Layer 1 (Pl. VII c, 5).

17. Thick sherd of a black-and-red vessel, painted on the exterior with groups of 4 vertical bands, interspersed with a row of horizontal short strokes, drawn vertically. Tr. 1, Layer 1 (Pl. VII c, 9).

18. Thick sherd of red ware with groups of uneven, vertical bands interspersed with thick dots. Tr. 1, Layer 1 (Pl. VII c, 10).

Red Slipped Ware

This ware is the same as the one encountered in various excavated sites of the region. It has a red and crackled surface. Common types include globular vessels, bowls and dishes. The following examples are illustrated:

Fig. 21.

13. Fragment of a neckless, globular vessel with flattened, sloping rim, having a number of grooves, sloping shoulder and a globular body. It has a red slip. Tr. 1, Layer 2.

14. Lid of dull red ware with flanged waist; not uniformly fired and has a blotchy surface. Tr. 1, Layer 2 (Pl. VIID, 2). *cf.* BR, Fig. 28, T. 162-64; CH, Fig. 48 A. 40, 42, & 43; MSK, Fig. 26, No. 7; and BHM, Fig. 18, Nos. 58, 58a.

15. Fragment of a bowl with large mouth and everted, flattened rim; dull red fabric with a thin red slip; the flattened top of the rim is decorated with stamped, lotus design. Tr. 1, Layer 2.

16. Fragment of a large bowl, with an open mouth and a flattened rim; appears to have had a semicircular handle, only a fragment of which is seen; the handle was luted to the rim; dull red fabric, and red slipped. Tr. 1, Layer 2.

17. Fragment of a concave-sided carinated shallow bowl, with an outturned, rounded rim, and a broad mouth. It has a highly polished red surface. Tr. 2, Layer 2.

18. Bowl or cup with a wide mouth, tapering sides towards a narrowing disc base; of coarse red fabric; unslipped. It is a common type found in early historic and later phases (Pl. VIID. 1). *cf.* CH, Fig. 47, A 21.

19. Fragment of a short spout, of red polished fabric, which was probably attached to the shoulder of a 'Kuja' type of vessel, having a high neck. Tr. 1, Layer 2. Similar vessels have been found at Brahmapuri (Kolhapur), Kondapur and Chandravalli. *cf.* CH, Fig. 46, Nos. i, ii and iii, p. 281.

20. Part of a sprinkler type of vessel, with a constricted neck, rounded body and having a spout on the sholder; red slipped ware. Tr. 1, Layer 1. *cf.* CH, Fig. 46, (iii).

B. GROUND & PECKED STONE INDUSTRY

62 tools of the neolithic complex were found during the excavations, possibly due to the limited nature of the dig. However, not many varieties of tools are found. Since the tools are all found in finished form they were manufactured, possibly at the source of the raw material, and brought to the site. About 10 miles upstream, trap dyke is reported to exist, in the Tungabhadra bed. The neolithic inhabitants of this site might have derived their raw material from this dyke. But the possibility of the tools being imported from other neolithic sites also cannot be ruled out. It is noteworthy here that the tools of the early phase are made on the locally available micaceous chlorite schist, the edges of flat slabs of which are ground and used, thus giving them a generally rectangular section. The tools of phase 2, on the other hand, are all made on hard trap, mostly fine-grained, and comparable to those of the other neolithic sites of Bellary and Raichur. They include a majority with lenticular or rounded cross-sections. For all the edge tools, they have used fine-grained dolerites, whereas for other tools, such as hammers and rubbers, coarse-grained material is preferred. The technique of manufacture is not different from that employed in other sites, already described (Allchin, 1957, pp. 321-35; Nagaraja Rao & Malhotra, 1965, pp. 55-56). It is perhaps worth remarking that the purposeful choice of tabular blocks of raw material in the earlier period, suggests a progression at Hallur from rectangular tools towards the familiar 'pointed butt' axes with lenticular sections. This shows how dangerous it is, as some have done, to make sweeping generalisations on the sole basis of typology and imagined limitations of metal tool types.

The following kinds of tools have been found during the excavations, which have been classified and described:

GROUND STONE INDUSTRY

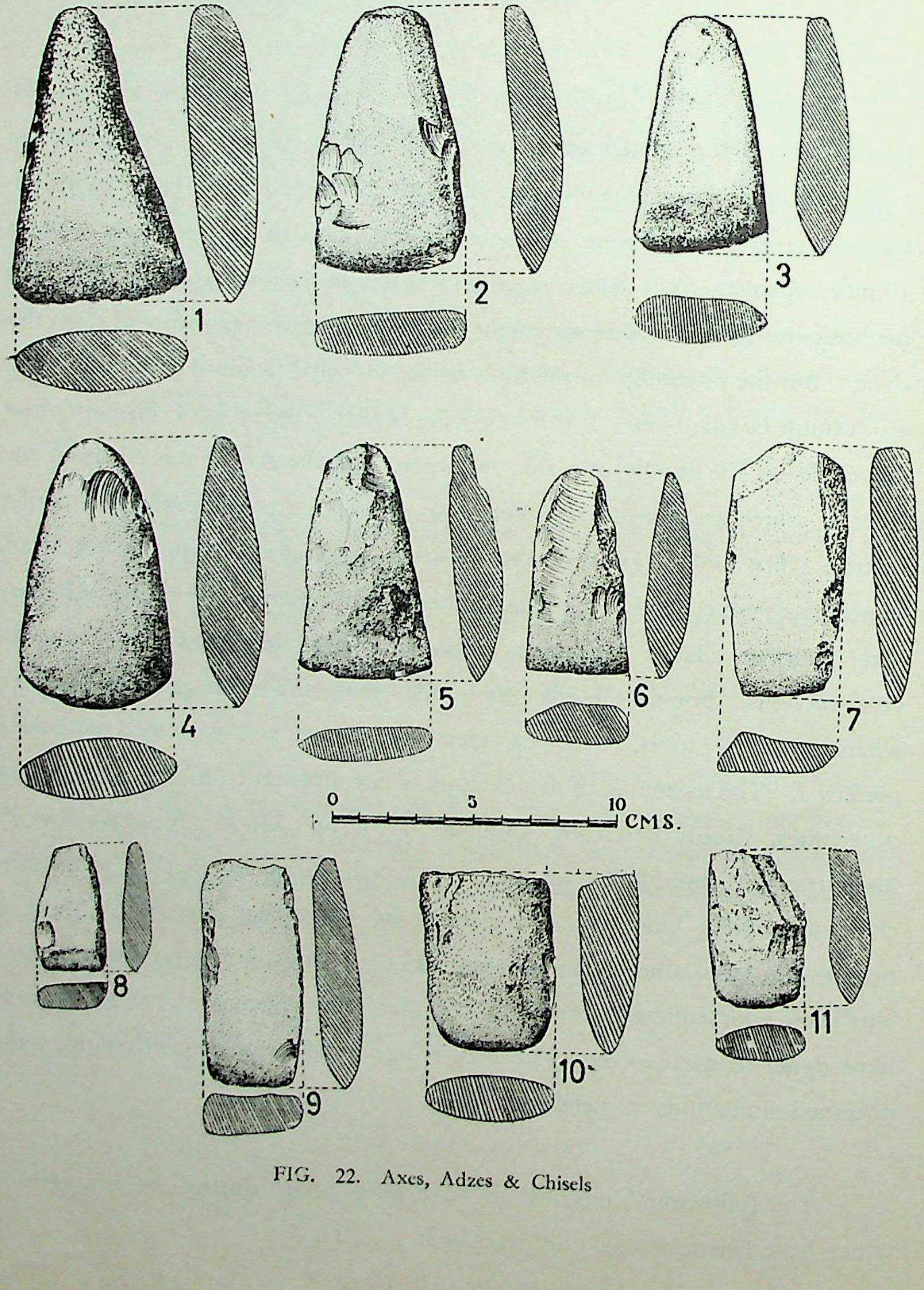
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FIG. 22. Axes, Adzes & Chisels

Axes —	13
Adzes —	2
Chisels —	8
Wedges —	8
Rubbers:	
(i) Spheroidal —	1
(ii) Oval —	9
Hammers:	
(i) Axe Hammers —	3
(ii) Discoidals —	3
(iii) Spheroidals —	8
(iv) Natural pebbles used as hammers —	2
Miscellaneous:	
(i) Disc —	1
(ii) Perforated discs —	4
Total	62

Classification:

As in the case of Tekkalakota, the tools of this site have also been classified into the following types with function as the criterion:

I Edge tools
II Points
III Rubbers & Grinders
IV Hammers and Pounders
V Miscellaneous.

I. *Edge tools*

Edge tools comprise axes, adzes, chisels, wedges, etc.

A. *Axes*

As many as 13 axes have been recovered from the deposits. They could further be grouped as follows:

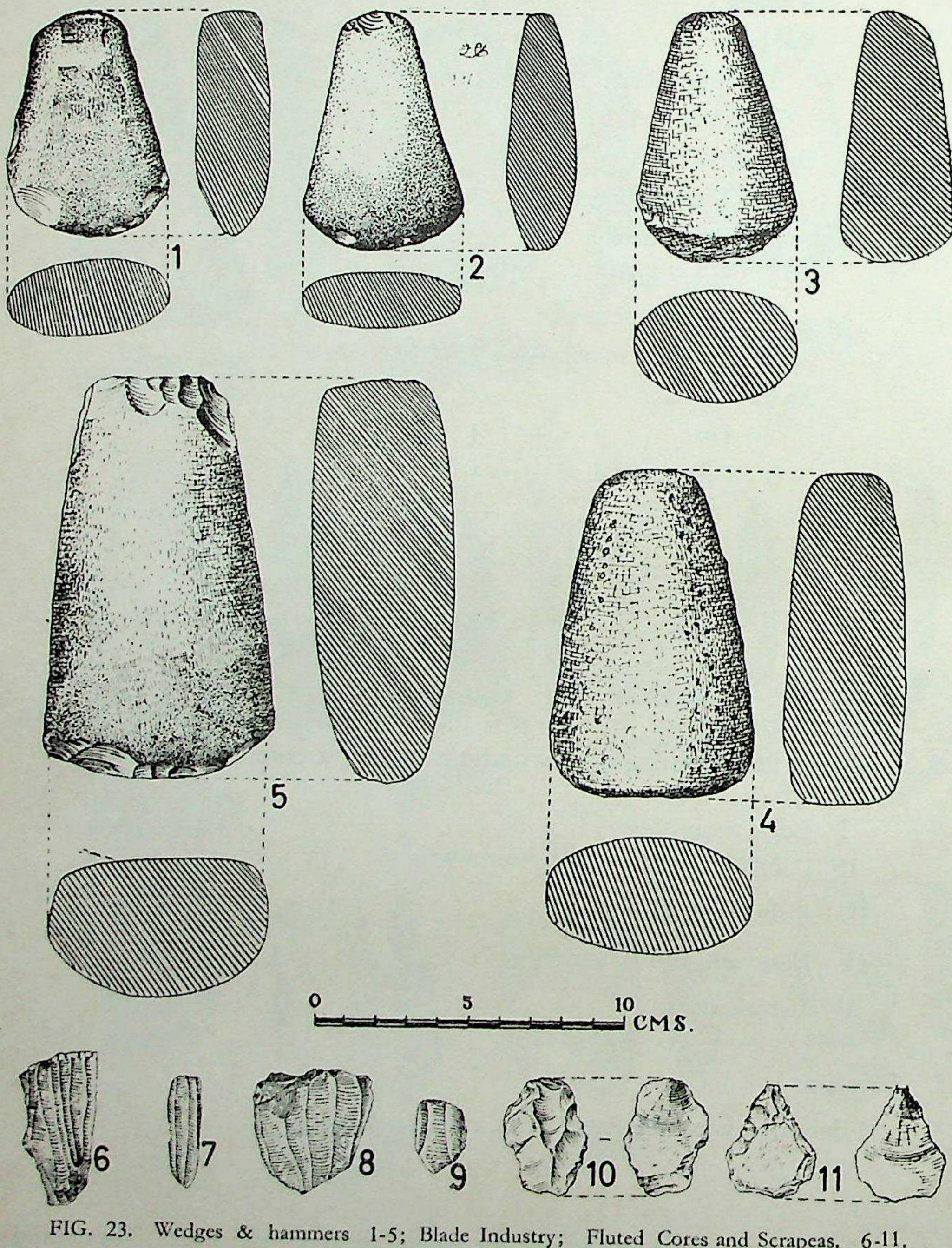
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FIG. 23. Wedges & hammers 1-5; Blade Industry; Fluted Cores and Scrapeas. 6-11.

i. Axes—Edge ground

Four axes—flat slabs with only the edges ground—are available in this group. All are made on dolerite. Only one example is illustrated.

1. An edge ground tool made on a flake with flaked surface and original cortex seen on the other side. Edge blunted due to use. Ovoid in section, fine grained dolerite (Pl. VIIIA, 11). Tr. 1, Layer 10. Period I, phase 2.

ii. Axes—Pecked and ground

Only three tools are found. All are illustrated.

2. An axe, pecked and ground, with an uneven, pointed butt and curved cutting edge. Pecking seen on sides. Ovoid in section ; dolerite (Pl. VIIIA, 9). Tr. 1, Layer 7. Period II.
3. An axe with ground edge and pecked all over ; pointed, blunted butt ; working edge blunted ; ovoid in section, dolerite (Pl. VIIIA, 10, Fig. 22, No. 1). Tr. 1, Layer 6. Period II.
4. An axe with arched, blunted butt and a straight, blunted cutting edge. Pecking marks seen on sides. Plano-convex in section ; dolerite (Pl. VIIIA, 8, Fig. 22, No. 2). Tr. 1, Layer 8. Period I, phase 2.

iii. Axes—Ground all over

There are five specimens. All are illustrated.

5. An axe with an arched butt, and an almost straight, sharp edge. The convex sides are well ground to meet at the cutting edge. Ovoid in section. Found on the floor of the circular structure No. 1 ; dolerite (Pl. VIIIA, 1, Fig. 22, No. 3). Tr. 1, Layer 9. Period I, phase 2.
6. An axe ground all over, with an almost flat butt, and blunted cutting edge. Ovoid in section. Tr. 1, Layer 1. Disturbed area (Pl. VIIIA, 5).
7. Axe with rounded butt and arched cutting edge. Ground all over ; ovoid in section ; fine-grained dolerite (Pl. VIIIA, 3, Fig. 22, No. 4).

8. Axe with broken, arched butt and blunted, arched cutting edge, bulbous body, ground all over ; sides show batterings. Ovoid in section ; dolerite (Pl. VIIIA, 4). Tr. 1, Layer 8. Period I, phase 2.
9. Axe with flattened butt and arched, sharp edge. Ground all over, but some parts of the surface not receiving polish due to the uneven surface. Ovoid in section ; fine-grained dolerite (Pl. VIIIA, 2). Tr. 1, Layer 7. Period II.

B. *Adzes*

These tools seem to have been so hafted that the cutting edge would be at right angles to the haft. The cutting edges of these tools are prepared in such a way that the two ground edges meet at a very acute angle. This type of tool is said to be essentially a carpenter's tool used to remove the irregular surfaces of wood. This accounts for hafting the tool transversely to the handle (Sankalia, 1964, p. 84).

There are two examples from the present excavation. Both are illustrated.

10. Adze, edge ground, with pecked and flaked body and arched butt. The convex surface curves round towards the cutting edge to meet the flat underside which rises gently to meet it. Plano-convex in section ; dolerite (Pl. VIIIA, 6; Fig. 22, No. 6). Tr. 1, Layer 5. Period II.

11. Adze with flaked and pecked butt end which is curved and thin. Edge ground to a sharp smooth surface. Ovoid in the centre. Dolerite (Pl. VIIIA, 7; Fig. 22, No. 5). Tr. 1, Layer 7. Period II.

C. *Chisels*

These tools have small, straight edges and most of them are broken at the butt. There are eight examples available from the dig. All are illustrated.

12. Chisel made on a flat slab by grinding only the edge. Butt end thick and uneven. Almost rectangular in section. Chlorite schist (Pl. VIIIB, 1; Fig. 22, No. 7). Tr. 1, Layer 14. Period I, phase 1.
13. A small chisel with butt end and working edge mutilated. Ground all over but not polished as the material is coarse grained.

Rectangular in section ; micaceous chlorite schist (Pl. VIIIB, 6). Tr. 1, pit sealed by Layer 14. Period I, phase 1.

14. Small chisel with a pointed butt and straight cutting edge, sides flattened. Working edge ground from both sides. Rectangular in section. Chlorite schist (Pl. VIIIB, 7). Tr. 2. Layer 11. Period I, phase 2.

15. Small chisel, ground all over and flattened butt. Working end ground from both sides. Rectangular in section. Phyllite (Pl. VIIIB, 8; Fig. 22, No. 8). Tr. 1. Layer 9. Period I, phase 2.

16. Chisel with broken butt and straight, sharp edge. Ground all over. Sides flattened. Rectangular in section. Micaceous chlorite schist (Pl. VIIIB, 2; Fig. 22, No. 9). Tr. 1, Layer 8. Period I, phase 2.

17. Working edge of a chisel with ground edge and roughened body. Butt end broken. Ovoid in section ; dolerite (Pl. VIIIB, 3; Fig. 22, No. 10). Tr. 1, Layer 7, Period II.

18. Small chisel with ground, sharp edge and rough surface ; butt end broken. Trapezoidal in section ; fine-grained dolerite (Pl. VIIIB, 4). Tr. 1, Layer 5. Period II.

19. Working half of a chisel with ground edge and roughly flaked body. Butt end broken. Ovoid in section ; fine-grained dolerite (Pl. VIIIB, 5; Fig. 22, No. 11). Tr. 2, Layer 5, Period II.

D. *Wedges*

These are thick and squat tools with blunted working edges and flattened butts. They seem to have been used as axe hammers when they could not be used as wedges as their edges became much blunted. There are 8 specimens.

20. Reused axe, either as a wedge or an axe-hammer. Flattened, blunted butt and blunted working edge. Pecked and ground. Underside shows a flake-scar. Ovoid in section; dolerite (Not illustrated). Tr. 1, Layer 12. Period I, phase 1.

21. Wedge with a flattened, blunted butt and blunted edge. Pecked all over. Ovoid in section (weathered). Epidiorite (Pl. IX A, 8). Tr. 1, Layer 12. Period I, phase 1.

22. A squat tool, with flat butt and curved, blunted edge. This could also have been used as a hand hammer ; dolerite (Pl. IXA, 5). Tr. 1, Layer 10; Period I, phase 2.

23. A reused axe, as a wedge. Flattened, blunted butt and blunted edge. Ground and pecked. Ovoid in section ; dolerite (Pl. IXA, 7; Fig. 23, No. 1); Tr. 1, Layer 7, Period II.

24. A wedge made on a blunted axe, butt end flattened and blunted, working edge also blunted. Underside flaked, making it plano-convex in section. Dolerite (Not illustrated). Tr. 1, Layer 7, Period II.

25. Wedge made on a reused axe with flattened butt and blunted working edge. Ground all over. Ovoid in section; fine-grained dolerite (Pl. IXA, 4; Fig. 23, No. 2). Tr. 2, Layer 7· Period I, phase 2.

26. Wedge with flattened butt and blunted edge. Ovoid in section ; granite. Tr. 1, Layer 6, Period II (Not illustrated).

27. Blunted axe reused as a wedge. Blunted, flattened butt and blunted cutting edge. Pecked and ground ovoid in section. Epidiorite (Pl. IXA, 6). Tr. 1, Layer 5. Period. II.

II. Points

No tools of this class have been found in the present excavation. But reference could be made to tools of this class found in the sites of contemporary period as they belong to the neolithic stone industry. Tools of this industry have been reported from the sites of Sanganakallu (Subbarao, 1948, pl. xxii, Nos. 79) and Piklihal (Allchin, 1960, pl. 44, No. 4) and Tekkalakota (Nagaraja Rao & Malhotra, 1965, Fig. 27 g).

III. Non-Edge Tools

Rubbers & Grinders

There are only a few specimens in this group of tools which can be divided into spheroidal and oval types.

Spheroidal Rubber. There is one example.

28. A perfect spheroidal rubber made on fine quartzite. It could also have been used as a sling stone (Pl. IXB, 3). Tr. 1, Layer 4, Period II.

Oval Rubbers

There are nine specimens. Two are illustrated.

29. An oval rubber, plano-convex in section, the plain side being well ground and smoothed due to use. Made on coarse granite (Pl. IXB, 5). Tr. 1, Layer. 10, Period I, phase 2.

30. A rubber stone, flattened and ground on both the sides, due to use. Almost oval in shape. Granite (Plate IXB, 4). Tr. 1, Layer. 10, Period I, phase 2.

Querns

Only a couple of querns were found in the site.

31. An oval, boat-shaped quern with an oval depression which is quite deep due to use. Coarse granite (Not illustrated). Tr. 1, pit sealed by Layer 14, Period I, phase 1.

IV. Hammers or Pounders

A number of tools which have been used as hammers are also recovered from the excavations. They could be grouped as (i) Axe-hammers and (ii) Discoidal and Spheroidal hammers. Some natural pebbles have also been used as hand hammers. The ends show battered marks due to use. They show clear marks of hammering, pecking, etc.

Axe Hammers

There are three examples of this type, which are illustrated.

32. Axe-hammer with flattened, blunted butt and flat edge. Ovoid in section. Coarse grained dolerite (Pl. IXA, 1; Fig. 23, No. 3). Tr. 1, pit sealed by Layer 5. Period II.

33. Axe–hammer with flattened and blunted butt and working edge. Pecked all over. Ovoid in section. Coarse grained dolerite (Pl. IXA, 3; Fig. 23, No. 4). Tr. 1, Layer 4. Period II.

34. Axe-hammer. A reused axe, pecked and edge ground, with a flattened butt and blunted, broken cutting edge. Ovoid in section. Coarse grained dolerite (Pl. IXA, 2; Fig. 23, No. 5). Tr. 1, Layer 5. Period II.

No. 20, described under wedges could also have been used as an axe hammer (*supra*, p. 79).

Discoidal hammer

There are three examples of this group. One is illustrated.

35. Discoidal hand hammer with two flattened surface and a circular pecked surface. Quartzite (Pl. IXB. 1). Tr. 2, Layer 10, Period I, phase 1.

Spheroidal hammer

There are eight specimens ; one is illustrated.

36. A spheroidal hand hammer, with eight flat faces due to use ; granite (Pl. IXB, 2). Tr. 2, Layer 4, Period II.

V. Miscellaneous

Stone objects which do not come under any of the categories described above, are grouped here. There are five stone discs. Four of them are perforated. All of them are made up of schistose material. They seem to have been used probably as spindle whorls. Many such perforated pottery discs are also found, described under terracottas.

37. Stone-disc, with ground edge, and perforated at the centre. Schist (Pl. IXC, 3). Tr. 1, Layer 9, Period I, phase 2.
38. Fragment of a disc with edge ground and perforated at the centre. Schist (Pl. IXC, 1). Tr. 1, Layer 8, Period I, phase 2.
39. A small disc with perforation in the centre. One side is well ground, while the other shows flaked surface. Schist (Pl. IXC, 4). Tr. 2, Layer 6, Period I, phase 2.
40. Stone disc with uneven edge and perforated at the centre. Schist (Pl. IXC, 2). Tr. 2, Layer 6, Period I, phase 2.
41. An unperforated stone disc made on micaceous chlorite schist (Not illustrated).

Table showing the Distribution of Stone Blade Industry in Time and Space

TRENCH 1

Layer	Fluted cores	Plunging flakes	Crested ridge flakes	Used Parallel-sided flakes	Blunted-back blades	Pen-knife blades	Lunates	Triangles	Saw blades	Scrapers	Points	Chips & flakes
1	2	3	4	5	6	7	8	9	10	11	12	13
9	6	12	1	76	6	2	13	2		2	3	89
10	1	2		27	3	2	2		1			141
11		3		5			1					1
12				5	1							2
13	1		1	2								6
Total	8	17	2	115	10	4	16	2	1	2	3	239
TRENCH 2												
9	1	1		14							1	11
10				7							1	40
Total	1	1		21							2	51

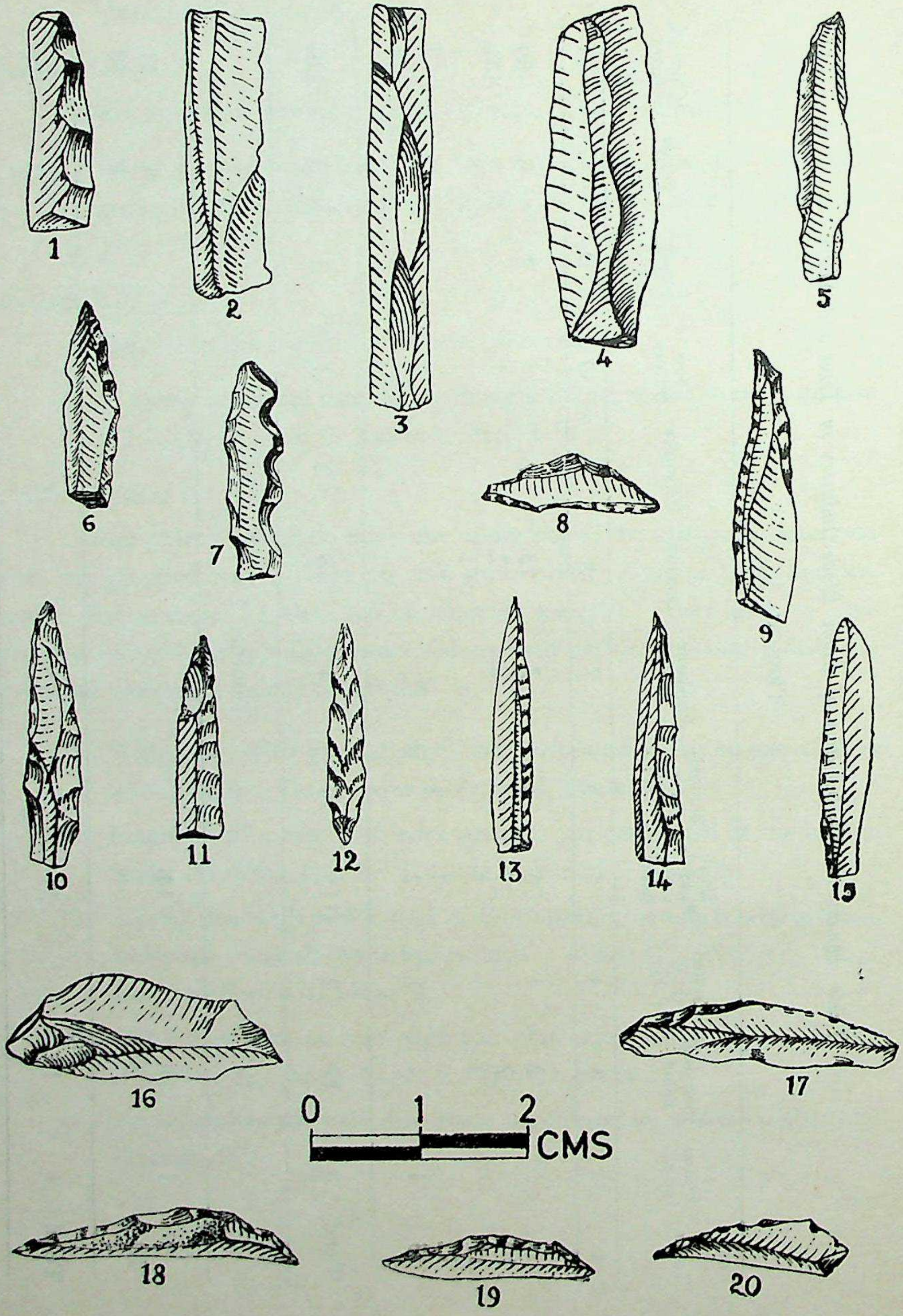
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FIG. 24. Parallel-sided blades, Serrated blades, Points and Lunates.

C. NEOLITHIC STONE BLADE INDUSTRY

This industry is confined to phase 2, of period I, although a crude quartz industry, represented by very few cores and tools, but with many flakes and chips, occurs in the latter part of phase 1. But a true blade industry, with the crested guiding ridge technique, typical of the chalcolithic sites of central India and the Deccan, is totally absent in phase 1. Even the tools of the crude quartz industry are very few and may possibly have infiltrated into the layers of the early phase, as there were a couple of pits in the limited area dug. It is interesting to note that no tools or flakes have been found in the phase 1 of Tr. 2.

But, as soon as we come to phase 2 of period I, there is a rich quantity of tools, and the crested ridge flakes and the fluted cores prove that the industry is akin to and typical of the chalcolithic blade industry, the technique of which has been described at great length by Subbarao (1955, pp. 126–149). There is a also a change in the material used. Black quartzite, not always fine grained, is used in plenty instead of the usual cherts of chocolate, coffee and brown hues, and chalcedony. This material might have been derived from the auriferous tract of the famous Honnali schist belt.[1] Even the T. Narsipur and Hemmige industries show the use of the same material.[2] The quartz tools are too few and very crude, possibly due to the very nature of the material.

Another important factor to be taken note of is that the blade industry is confined largely to the chalcolithic layers 9 and 10. As already mentioned, these layers constitute a series of floor levels, and in the thin debris in between each floor a number of tools occur. Further two structural plans have been exposed in these layers and the blades, cores, and flakes, have largely been recovered within the house. Again, it is noteworthy that there are very few cores, compared to the number of tools, and also very little of waste flakes. It is, therefore, possible that the tools were prepared elsewhere and therefore, we find

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1. Grateful thanks are due to Dr. M. S. Sadashiviah, Professor of Geology, Karnatak University, Dharwar, for having kindly examined the material, by preparing a thin section, and provided the identification.
2. Thanks are due to the excavators Dr. Seshadri and Sri M. Hanumanta Rao, respectively, for having kindly allowed me to examine their material, in the Archaelogical Department Museum, at Mysore, immediately after Hallur excavations.

the tools within the houses only. This gains more ground, when we note that the blades and other tools die out and are not found in the overlap layers, although other cultural traits such as pottery and stone axes, continue. But this may be due to the introduction of iron when the use of stone blade tools was given up. However, these observations are tentative, as the area excavated is too limited. The appended table shows the distribution of the tools in space and time (p. 74). Selected specimens are described and illustrated :

1. Fluted core with a well prepared striking platform and showing five flutings. Black quartzite. Surface (Pl. XA, No. 1; Fig. 23, No. 6).
2. A slender fluted core showing eight flutings. Black quartzite. Tr. 1, pit sealed by Layer 10 (Pl. XA, No. 2; Fig. 23, No. 7).
3. Fluted core of black quartzite. Tr. 1, Layer 9 (Pl. XA, No. 3).
4. Fluted core made on a piece of flat, black quartzite. Tr. 1, Layer 9 (Pl. XA, No. 4).
5. Fluted core of quartz (Fig. 23, No. 8). Surface find.
6. Fragment of a core with two flutings. Quartz. Tr. 1, Layer 13 (Fig. 23, No. 9). Phase 1, Period I. This could have intruded to this layer through the pit cut into Layers 11, 12 and 13 and sealed by Layer 10.
7. A broken, fluted core with a well prepared platform. Quartz. Tr. 1, Layer 9 (Not illustrated).
8. Fragment of a parallel-sided flake showing the crested guiding ridge. Quartzite of deep brown colour. Tr. 1, Layer 12 (Pl. XA, No. 5; Fig. 24, No. 1).

   This specimen also seems to have got into Layer 12, through the pit which cut Layers 11 and 12, and was sealed by Layer 10. When the blade industry is absent in the phase 1, the occurrence of only one crested guiding ridge flake is doubtful.
9. A discoidal scraper with the original cortex seen and showing part of the platform. Quartz. Tr. 1, Layer 9 (Pl. XA, No. 8).
10. Fragment of a parallel-sided blade with marks of use. Black quartzite. Tr. 1, Layer 10 (Pl. XB, No. 1; Fig. 24, No. 2).

11. A parallel-sided blade. Black quartzite. Tr. 1, Layer 9 (Pl. XB, No. 2).

12. Parallel-sided blade. Black quartzite. Tr. 1, Layer 9 (Pl. XB, No. 3).

13. Parallel-sided blade. Black quartzite. Tr. 1, Layer 9 (Pl. XB, No. 4).

14. Parallel-sided blade. Black quartzite. Tr. 1, Layer 9 (Pl. XB, No. 5; Fig. 24, No. 3).

15. A parallel-sided blade of quartz. Tr. 1, pit sealed by Layer 10 (Pl. XB, No. 6; Fig. 24, No. 4).

16. } Fragments of parallel-sided blades. Quartz. Tr. 2, Layer 9 (Pl. XB,
17. } Nos. 7, 8).

18. A parallel-sided blade with a blunted back. Black quartzite. (Pl. XB, No. 9, Fig. 24, No. 5).

19. An obliquely retouched blade, possibly a pen-knife. Black quartzite. Tr. 1, Layer 9 (Pl. XB, No. 10, Fig. 24, No. 6).

20. Fragment of a saw blade with blunted back and well made dentition. Black quartzite. Tr. 1, pit sealed by Layer 10 (Pl. XB, No. 11, Fig. 24, No. 7).

21. A triangle, with the sides of the apex retouched. Black quartzite, Tr. 1, Layer 9 (Pl.X B, No. 12, Fig. 24, No. 8).

22. A slender point with retouched sides and a broken tip. Black quartzite. Tr. 1, Layer 9 (Pl. XB, No. 13).

23. A point with retouched back. Black quartzite. Tr. 1, Layer 10 (Pl. XB, No. 14, Fig. 24, No. 9).

24. An asymmetrical point with retouched sides and a sharp pointed tip. Basal end broken. Quartz. Tr. 1, Layer 9 (Pl. XB, No. 15, Fig. 24, No. 10).

25. A point with a sharp tip and blunted side. Quartz. Tr. 1, Layer 9 (Pl. XB, No. 16, Fig. 24, No. 11).

26. A small point with retouched sides. Quartz. Tr. 1, Layer 9 (Pl. XB, No. 17, Fig. 24, No. 12).

27. Obliquely retouched point made on quartz. Tr. 2, Layer 9 (Pl. XB, No. 18, Fig. 24, No. 13).

28. A point with a retouched side and tapering to a sharp tip. Black quartzite. Tr. 1, Layer 9 (Pl. XB, No. 19, Fig. 24, No. 14).

29. A flake with a retouched side and having a pointed tip. There is retouch at the basal end, probably intended to be made a notched point. Quartz. Tr. 1, Layer 9 (Pl. XB, No. 20, Fig. 24, No. 15).

30. A flake probably intended to be made a lunate. Milky quartz. Tr. 1, Layer 11 (Pl. XB, No. 21, Fig. 24, No. 16).

31. A lunate of quartz, with one end mutilated, and having a blunted arc. Tr. 1, pit sealed by Layer 10 (Pl. XB, No. 22, Fig. 24, No. 17).

32. A lunate with blunted arc. Original cortex seen on the upper side. Black quartzite. Tr. 1, Layer 9 (Pl. XB, No. 23, Fig. 24, No. 18).

33. A lunate, with blunted arc and mutilated working edge. Black quartzite. Tr. 1, Layer 10 (Pl. XB, No. 24).

34. A lunate, with blunted arc and mutilated working edge. Black quartzite. Tr. 1, Layer 10 (Pl. XB, No. 25).

35. A small lunate with blunted arc. Made on quartz. Tr. 1, Layer 9 (Pl. XB, No. 26, Fig. 24, No. 19).

36. Lunate with blunted arc. Made on chert. Tr. 1, Layer 9 (Pl. XB, No. 27).

37. Lunate, arc blunted and one end broken. Quartz. Tr. 1, Layer 10 (Pl. XB, No. 28, Fig. 24, No. 20).

38. A lunate with the blunted arc and the cutting edge retouched from the underside. Quartz. Tr. 1, Layer 9 (Pl. XB, No. 29).

39. A small lunate with blunted arc. Quartz. Tr. 1, Layer 9 (Pl. XB, No. 30).

40. A small lunate of quartz. Tr. 1, Layer 10 (Pl. XB, No. 31).

41. A small lunate with the arc blunted. Black quartzite. Tr. 1, Layer 9 (Pl. XB, No. 32).

D. METAL OBJECTS

The earlier phase of period I of the site is devoid of any metal, in the limited excavations. A limited quantity of copper objects occur in phase 2 of period I. That copper was known and used sparsely in all the excavated chalcolithic sites of the Deccan, is a common feature. But period II, the Iron Age, is rich in metal objects even in the restricted area of excavations.

The following table shows the distribution of metal objects :—

Material	Period I		Period II	Disturbance
	Phase 1	Phase 2		
Copper	..	3	1	2
Iron	..	..	18	..
Total	..	3	19	2

Thus in all, there are 24 objects recovered from the site.

Period I. Phase 2 :

1. A miniature, double-edge axe, made on thin sheet of copper with a broad edge and concave middle, looking like a brooch or bow. Tr. 1, Layer 10 (Pl. XIA, No. 1, Fig. 25, No. 1).

   The use of this tool is uncertain. It is so small that it cannot be used for cutting wood. It is also very thin to be used as a scraper. In all probability it is a cult object.

   There are two specimens so far known which could be compared with the present example. One is from Bhagra Pir (Orissa), illustrated by Gordon (1958, p. 136, Fig. 17, No. 11 and p. 191). The other is a surface find from Brahmagiri (Pl. XIA, No. 5).[1]

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[1] Courtesy: A. Dr. Sundara.

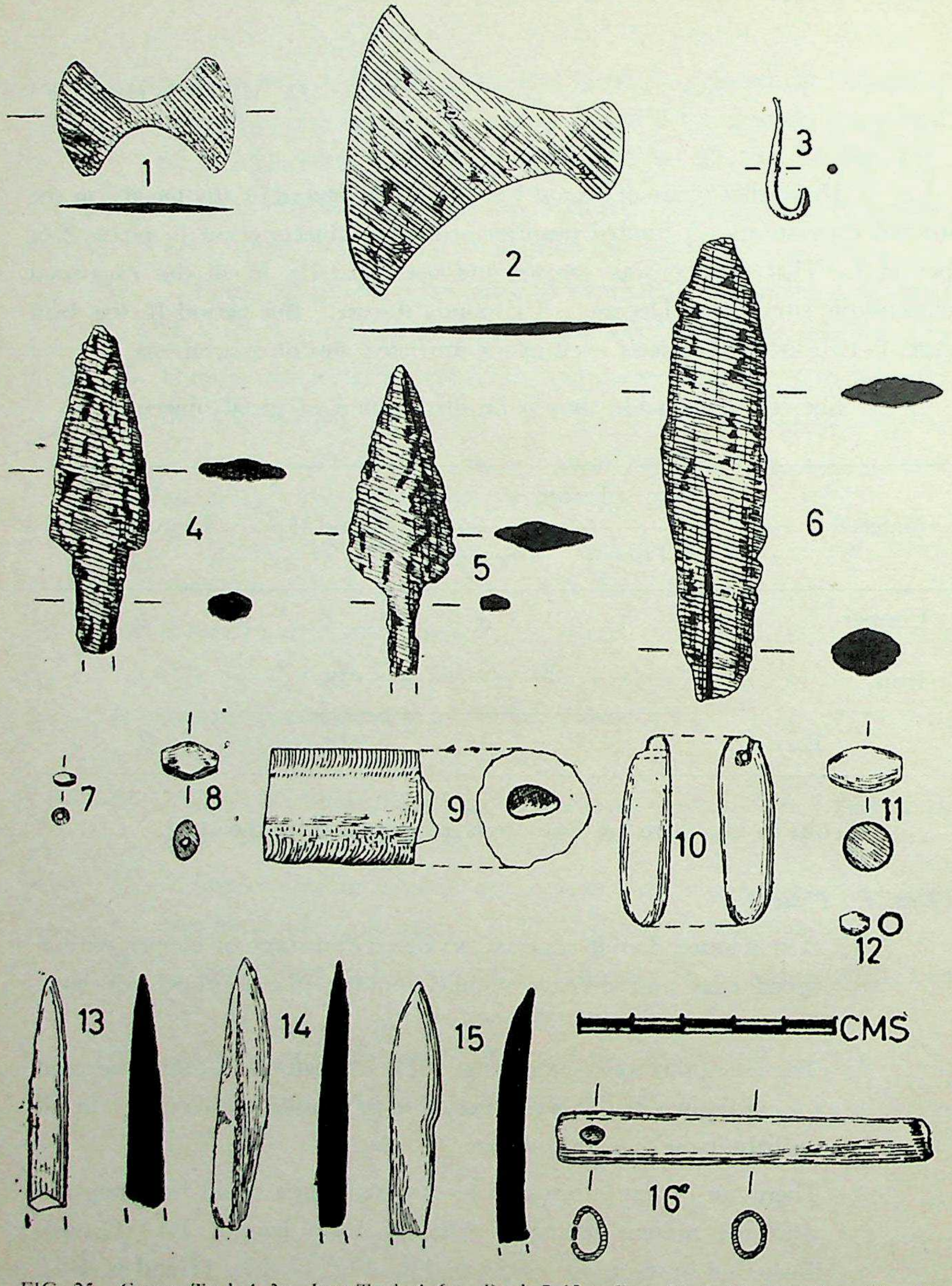
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FIG. 25. Copper Tools 1-3 ; Iron Tools 4-6 ; Beads 7-12 ; Bone Tools 13-15 ; Bone Pipe 16.

It is also a fragment of bifacial, miniature axe, made on a thin sheet of copper, measuring 18.5 mm × 14 mm.

2. Flat, miniature axe, with a broad, cutting edge, and is like a *Parasu* in shape. Made on a thin sheet of copper. Tr. 2, Layer 8 (Pl. XIA, No. 2, Fig. 25, No. 2).

It is difficult to conceive the use of such a miniature tool, unless it is used for finer works such as scraping of leather, etc. It is interesting that a similar tool of steel hafted to a wooden handle, is used by the present-day cobblers for cutting and scraping leather. Otherwise, the present specimen could also be a cult object.

3. A small fish hook, with the out-curved upper end flattened and the end of the hook pointed. Made on a round copper wire. Tr. 1, Layer 9 (Pl. XIA, No. 4, Fig. 25, No. 3). Similar hooks have been found at Nevasa, Tekkalakota and other sites.

Period II

4. A copper rod, circular in section and ends broken ; heavily encrusted. Tr. 2, Layer 4 (Pl. XIA, No. 3).

Iron objects

Iron objects chiefly consist of arrowheads, spear-heads, knife blades and points. The people who arrived here with iron, came with the full knowledge of metallurgy and finished tools. The following tools are described and illustrated.

1. An arrowhead with a pointed tip, and prominent tang and a short stem. A side of the tool is mutilated. Heavily encrusted. Tr. 1, Layer 5 (Pl. XIC, No. 1).
2. An arrowhead, with a prominent tip, rounded tang and short stem. Tr. 2, pit sealed by Layer 4 (Pl. XIC, No. 2).
3. An arrowhead, with pointed tip, pronounced tang and long stem. Tr. 1, Layer 5 (Pl. XIC, No. 3, Fig. 25, No. 4). Heavily encrusted with grains which have been identified as rice and millet (*Paspalum scrobiculatum*, Linn. (see below section on Plant Economy).

4. An arrowhead with an elongated body and short stem. The tanged sides are rounded. Tr. 1, Layer 4 (Pl. XIC, No. 4).

5. An arrowhead with pronounced tangs, pointed tip and a long stem. Heavily encrusted and some grains adhere to the surface. Tr. 1, Layer. 5 (Pl. XI C, No. 5).

   The grains have been identified tentatively as the millet, *Paspalum scrobiculatum,* Linn. (see below section on Plant Economy).

6. An arrowhead with a pointed tip, pronounced tangs, and a medium stem. Tr. 1, Layer 4 (Pl. XIC, No. 6).

7. An arrowhead with an elongated body, pointed tip, pronounced tang, and a long stem; heavily encrusted. Tr. 1, Layer 4 (Pl. XIC, No. 7, Fig. 25, No. 5).

8. A small arrowhead, with pronounced tang and broken stem. Heavily encrusted. Tr. 1, Layer 5 (Pl. XIC, No. 8).

9. Fragment of an implement, possibly an arrowhead, with broken ends. Tr. 2, pit sealed by Layer 4 (Not illustrated).

10. A knife blade or dagger ; encrusted ; lower end broken. Tr. 1, Layer 3 (Pl. XID, No. 1, Fig. 25, No. 6).

11. A knife blade, or a dagger ; encrusted and broken stem. Tr. 1, pit sealed by Layer 5 (Pl. XID, No. 2).

12. A dagger or knife with pointed tip and rounded base. Encrusted. Tr. 2, Layer 5 (Pl. XID, No. 3).

13. A spearhead with a long, thin shaft. The pointed end broken. Tr. 2. pit sealed by Layer 4 (Pl. XID, No. 4).

14. A spearhead with rounded shoulders, and a short stem ; pointed end broken. Tr. 2, Layer 3 (Pl. XID, No. 5).

15. Fragment of a knife or dagger, encrusted and corroded (Not illustrated).

16. A point, circular in section and pointed tip. Encrusted. Tr. 2, Layer 2 (Not illustrated).

17. A point with a sharp tip and encrusted body. Circular in section (Not illustrated). Tr. 2, Layer 2.

Disturbed Deposit

Two metal objects have been collected from the disturbed deposit. They appear to be of very late period.

18. A copper ladle with two spoons at either end. Engraved with groups of grooves at intervals. It appears to be quite modern. Tr. 2, pit sealed by Layer 1 (Pl. XIB).
19. A copper coin with legend in Urdu. Tr. 1, Layer 1 (Not illustrated).

E. BEADS

Compared to the area dug, there is a rich collection of beads from the excavations. The following table shows the distribution of beads in the site in space and time.

Material	Period I		Period II	Disturbance
	Phase 1	Phase 2		
1. Shell	2	40	..	..
2. Quartz stone	..	1	..	..
3. Steatite	..	15	..	..
4. Bone	..	1	2	..
5. Carnelian	..	..	1	..
6. Terracotta	..	5	1	2
7. Gold	..	..	1	..
8. Green stone	..	..	1	..
9. Antler	..	..	1	..
Total	2	62	7	2

Thus there is a total collection of 73 beads.

As the chart shows, phase 1 of period I is very poor in beads, whereas phase 2 is not only rich but there is variety in the materials used. However, the types are monotonously similar, majority of them being disc beads. Shell and steatite beads are in majority.

The shell and steatite beads become conspicuous by their absence in period II. The one gold bead appears to be of Iron Age on the basis of its type.

The upper disturbed deposit has also yielded terracotta beads of areca-nut shape which could easily be ascribed to the early historic period. Some russet-coated painted ware pottery has also been recovered from this deposit thus confirming the occupation during the early historic times.

The following types of beads are described and illustrated.

Period I. Phase 1

No. 1. A small disc bead, made on shell. Tr. 2, Layer 11 (Pl. XIIB, No. 9).

2. A shell, edges ground to make a bead. Tr. 1, Layer 14 (Pl. XIIA, No. 12).

Period I. Phase 2

3. A hand-moulded terracotta bead, short and biconical with a perforation. Tr. 1, Layer 8 (Pl. XIIA, No. 1).

4. An almost biconic bead, short, circular, terracotta. Appears to be hand fashioned. Tr. 2, Layer 9 (Pl. XIIA, No. 2).

5. A spherical bead, hand made, Terracotta. Tr. 1, Layer 8 (Pl. XIIA, No. 3).

6. A crude, hand made, terracotta, one end pinched up. Tr. 1, Layer 8 (Pl.XIIA, No. 4).

7. A crude, uneven, small bead, terracotta. Tr. 1, Layer 9 (Pl.XIIA, No. 5).

8. Short, barrel, bicone bead of bone. Tr. 1, Layer 7 (Pl. XIIA, No. 11; Fig. 25, No. 7).

9. A small shell with ground edge. Tr. 2, Layer 9 (Pl. XIIA, No. 13).

10. A ground conch shell, perforated. Tr. 1, Layer 11 (Pl. XIIA, No. 14).

11. Short, barrel, circular bead of quartz. Tr. 1, Layer 8 (Pl. XIIB, No. 3).

12. A short circular, biconic bead of shell. Tr. 1, Layer 8 (Pl. XIIB, No. 5).

13. A disc bead of shell. Tr. 1, Layer 11 (Pl. XIIB, No. 6).

14. Disc bead. Shell. Tr. 1, Layer 10 (Pl. XIIB, No. 7).

15. }
16. } Short, circular beads. shell. Tr. 1, Layer 10 (Pl. XIIB, Nos. 15 & 17).

17. Disc bead, shell. Tr. 1, Layer 8 (Pl. XIIB, No. 8).

18. {Large disc beads, steatite. Tr. 1, Layer 10 (Pl. XII B, Nos. 10 & 11).
19. {

20. {Small disc beads, steatite. Tr. 1, Layer 10
22. {(Pl. XIIB, No. 13, 14 and 18).

23. Medium disc bead, Steatite. Tr. 1, Layer 11 (Pl. XIIB, No. 12).

24. A small disc bead, steatite. Tr. 1, Layer 7 (Pl. XIIB, No. 16).

Period II

25. A terracotta bead with conical base and wide perforation. Tr. 2, Layer 3 (Pl. XIIA, No. 6).

26. An antler fragment with a roughly circular section, probably used as a bead. Tr. 2, Layer 5 (Pl. XIIA, No. 8, Fig. 25, No. 9).

27. A short, tubular (barrel) bead, oval in section, made of bone. Tr. 1, Layer 5 (Pl. XIIA, No. 9).

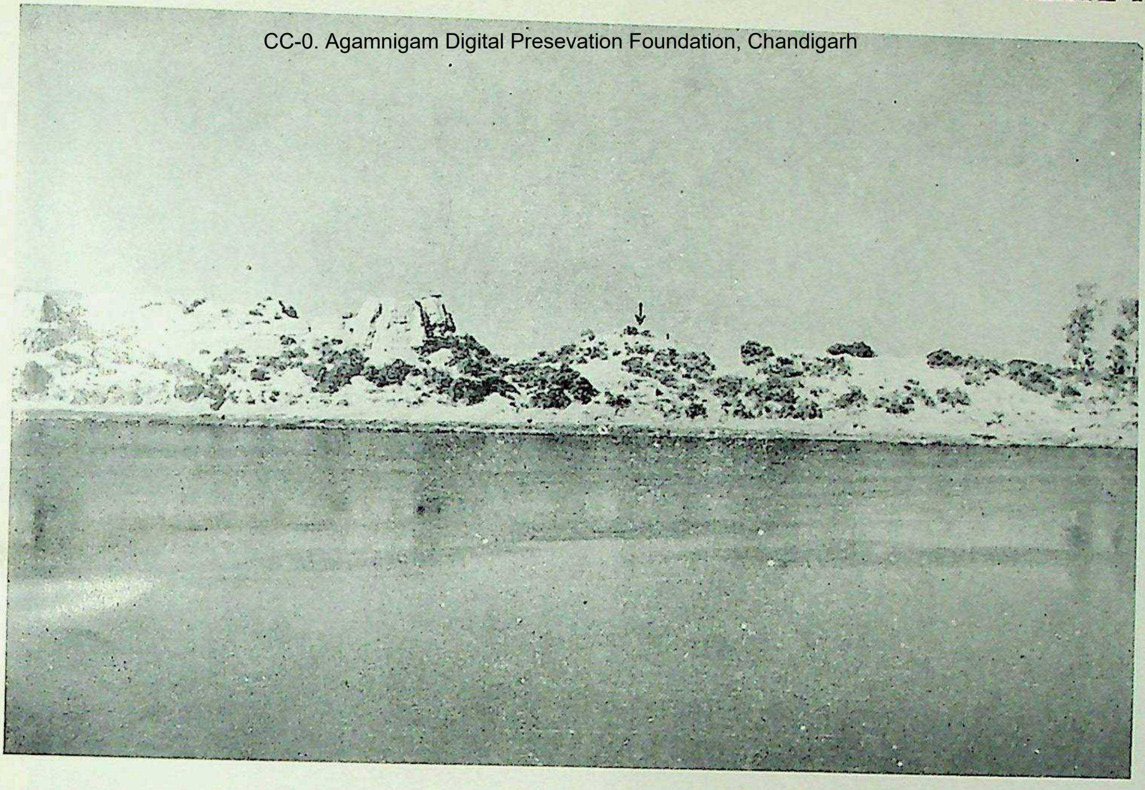
28. Biconic, truncated bead of bone. Tr. 1, Layer 4 (Pl. XII A, No.10, Fig. 25, No. 8).

29. A pendant, with a perforation at the top, made on green stone Tr. 2, Layer 4 (Pl. XII B, No. 1, Fig. 25, No. 10).

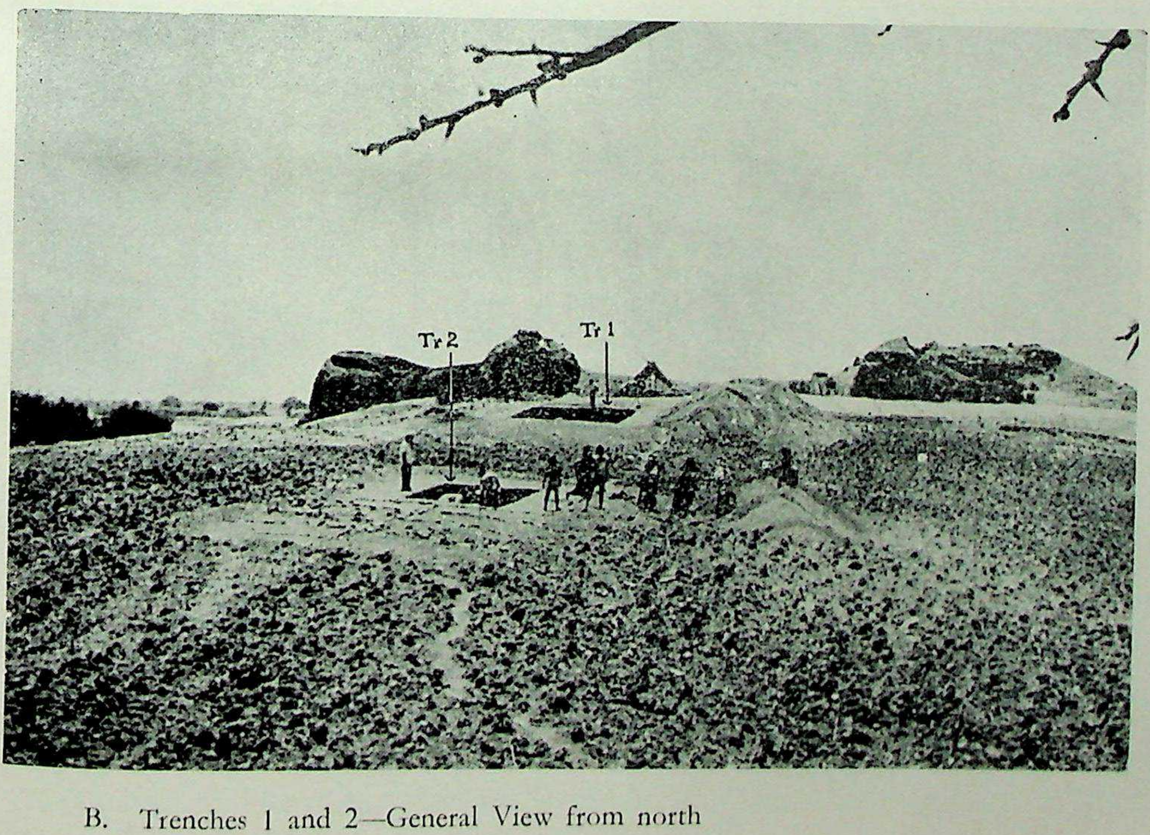
30. A carnelian bead, barrel, bicone, circular. Tr. 1, Layer 5 (Pl. XIIB, No. 2, Fig. 25, No. 11).

31. A short, biconical, circular bead barrel in shape. Gold. Tr. 1, Layer 9 (Pl. XIIB, No. 4, Fig. 25, No. 12).

32. An arecanut shaped terracotta bead, typologically ascribable to early historic period. Tr. 1, Layer 1 (Pl. XIIA, No. 7). Occurs in the disturbed layers.

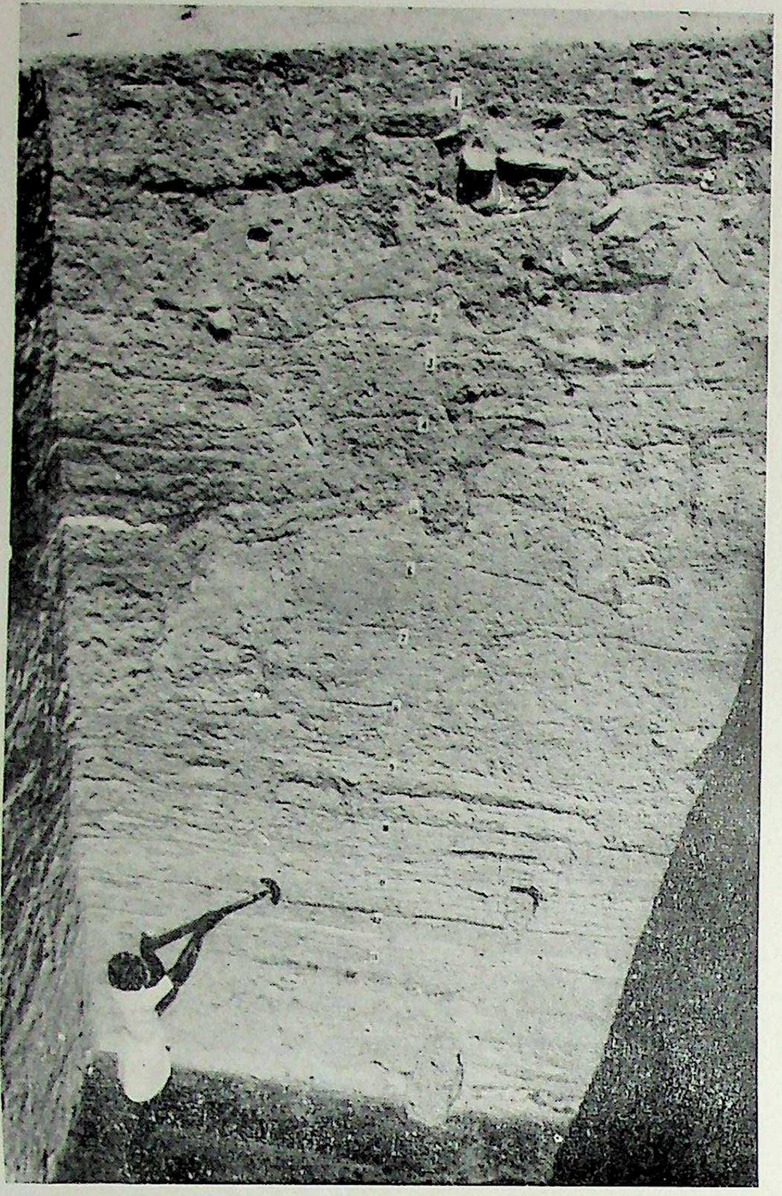


A. Hallur Mound—General View from east

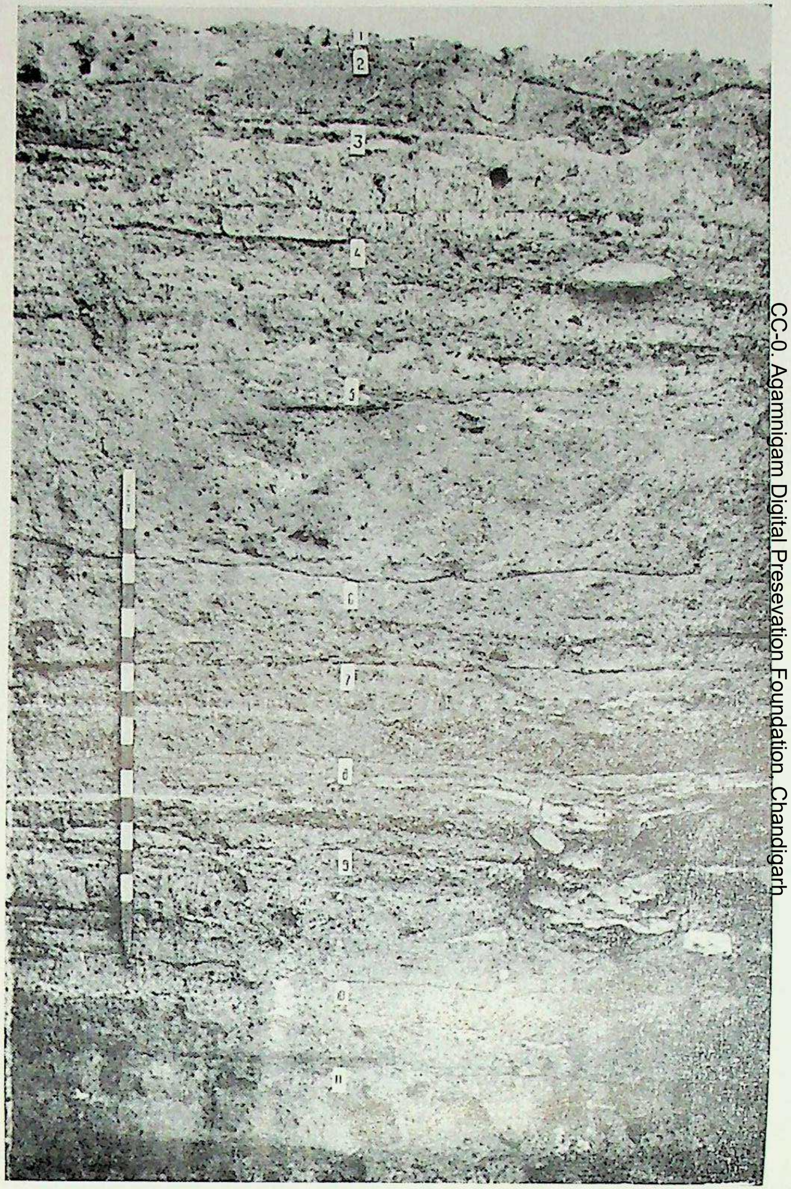


B. Trenches 1 and 2—General View from north

PLATE II



A. Trench 1—Section facing west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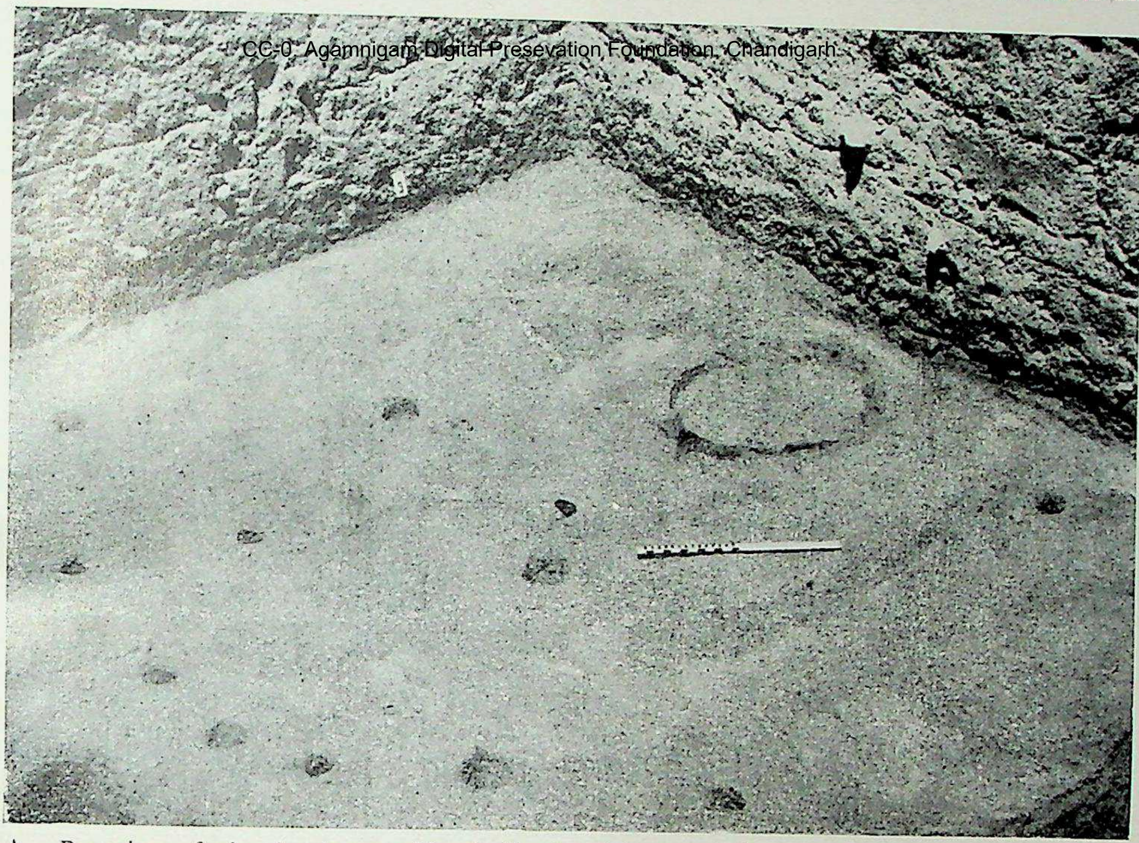
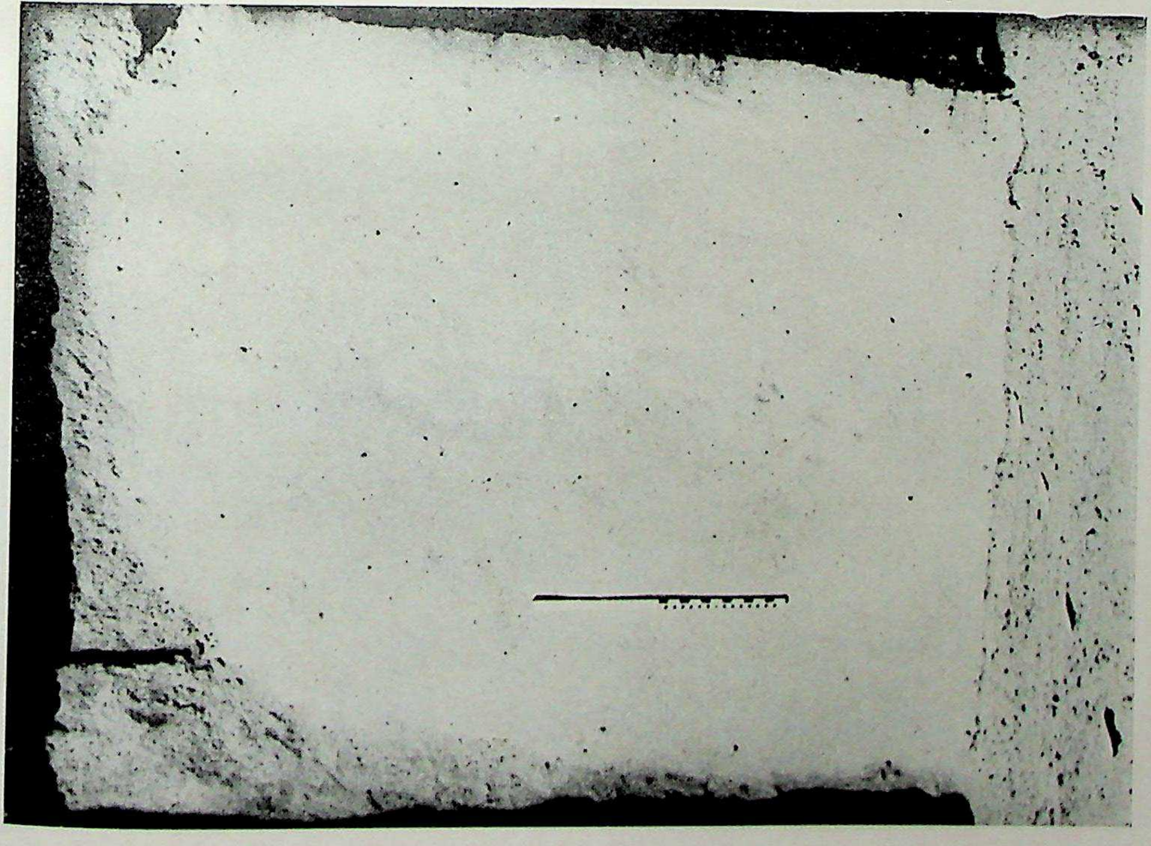
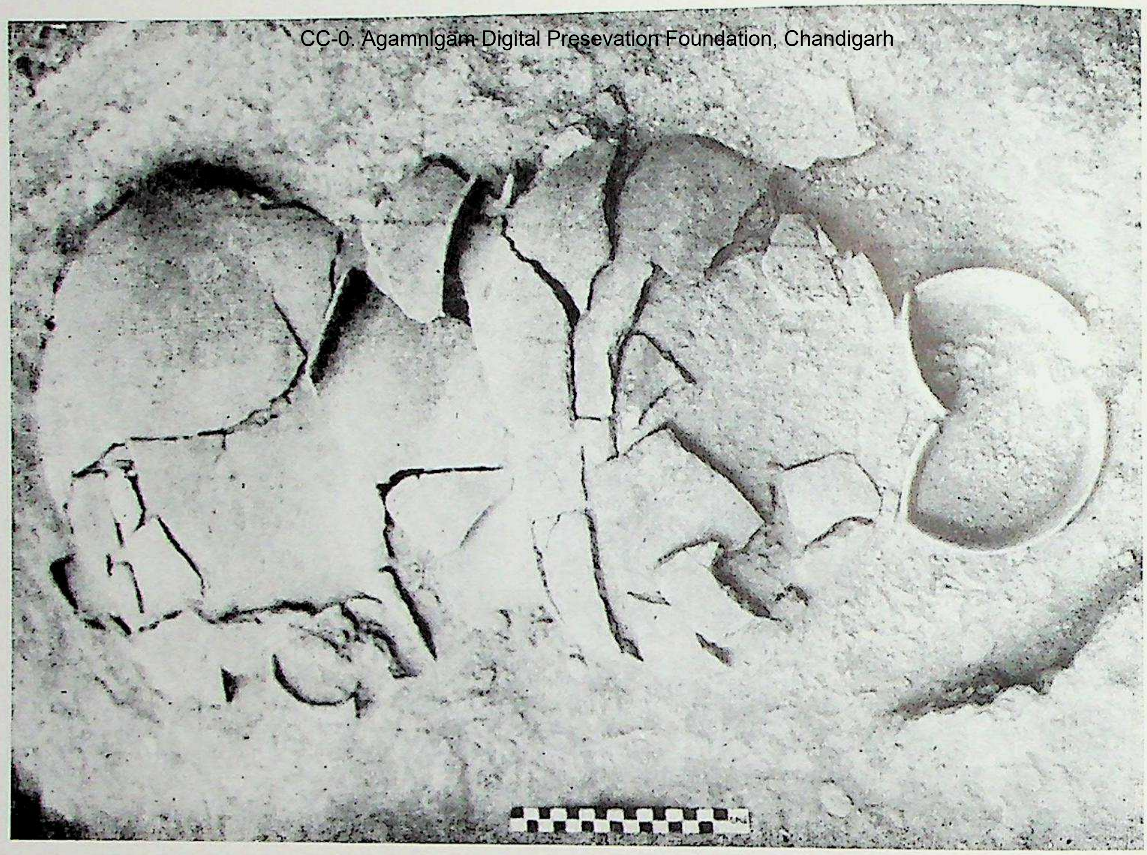
B. Trench 2—Section facing north



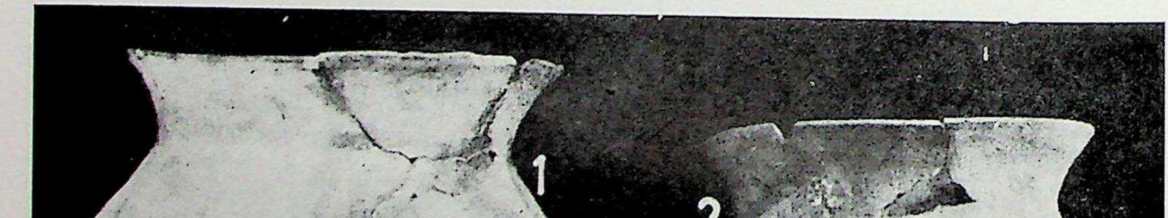
A. Remains of circular house, No. 1, Tr. 1, with post-holes, circular fireplace and an axe



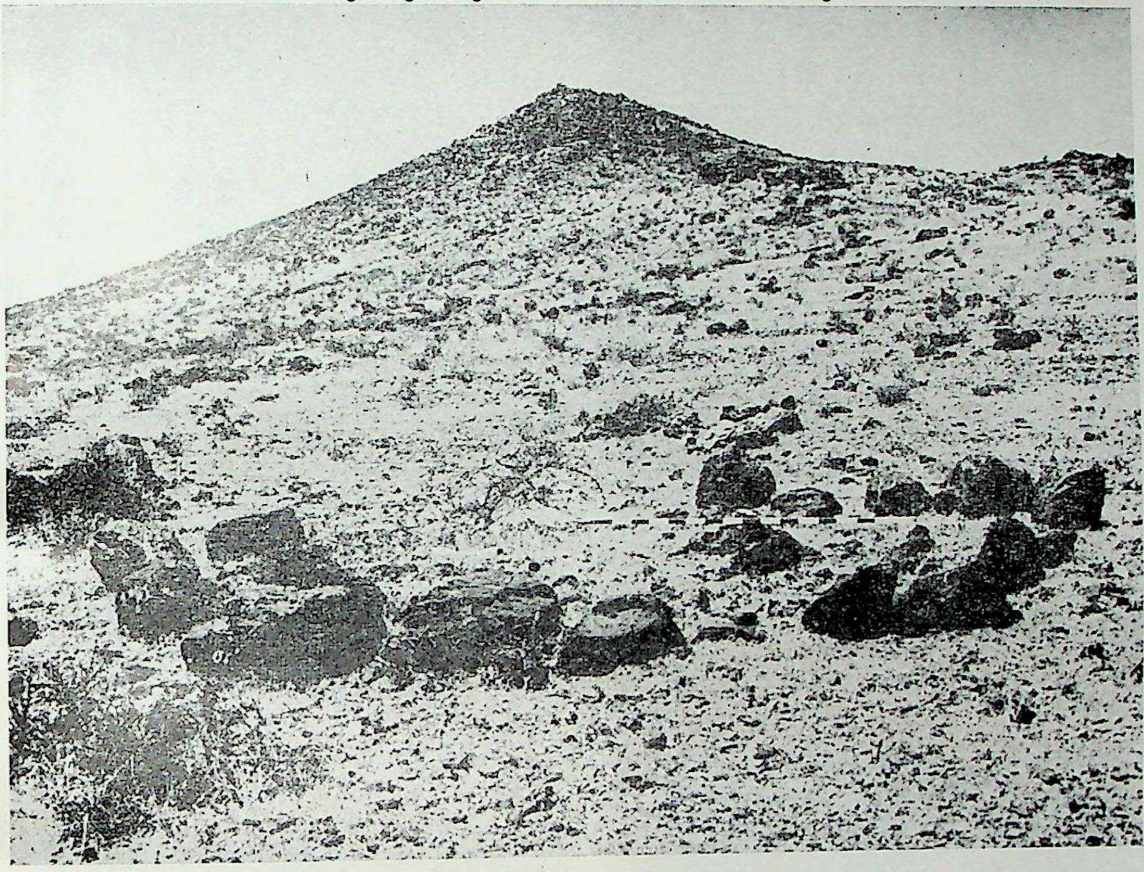
B. Remains of circular house No. 2, with fine river sand spread on the floor



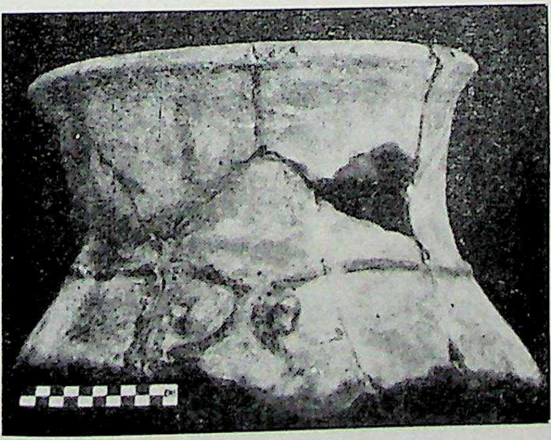
A. Double-urn child burial. Tr. 1



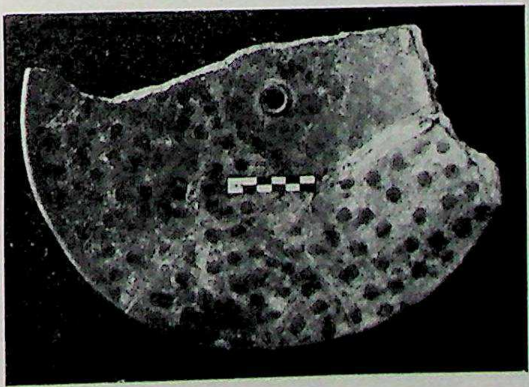
B. Burial urns and grave goods



A. Iron Age Dolmenoid cist—at the foot of the Bhairavanapada hill, 3 miles north of Hallur

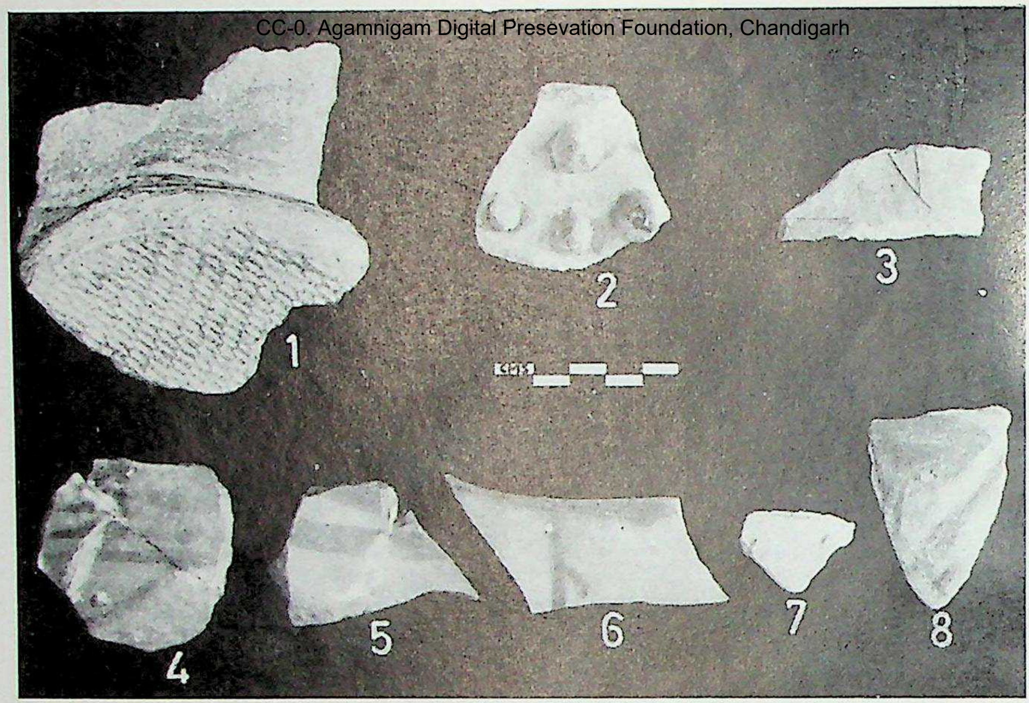


B. Burial jar with applique

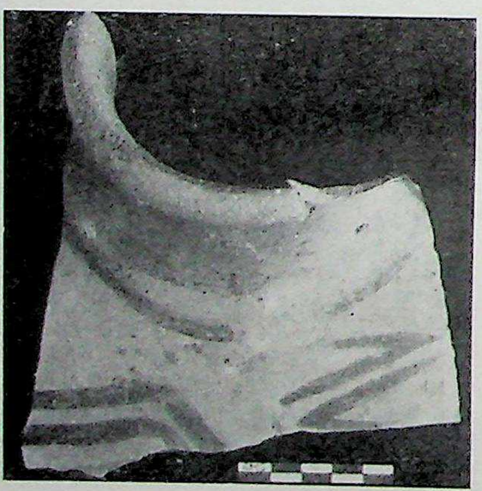


C. Handmade lid with perforation at the centre and dots of red ochre (Neolithic)

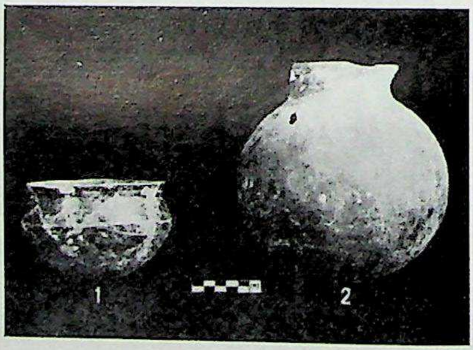
PLATE VI



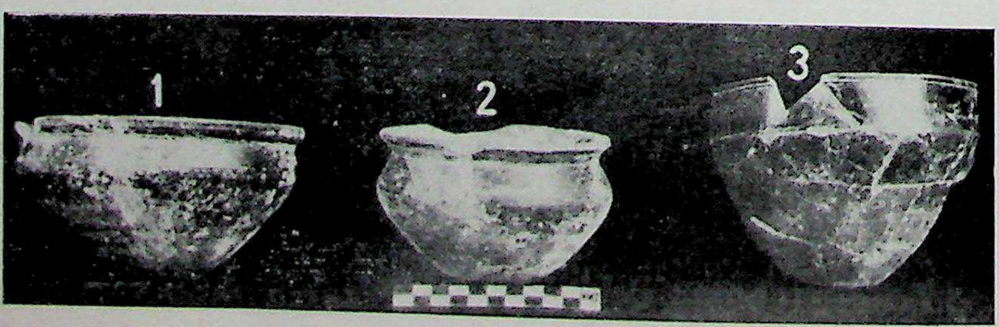
A. Decorated pottery with mat impression, applique, incised and painted decorations (Neolithic–Chalcolithic)



B. Painted pottery (akin to Jorwe ware)

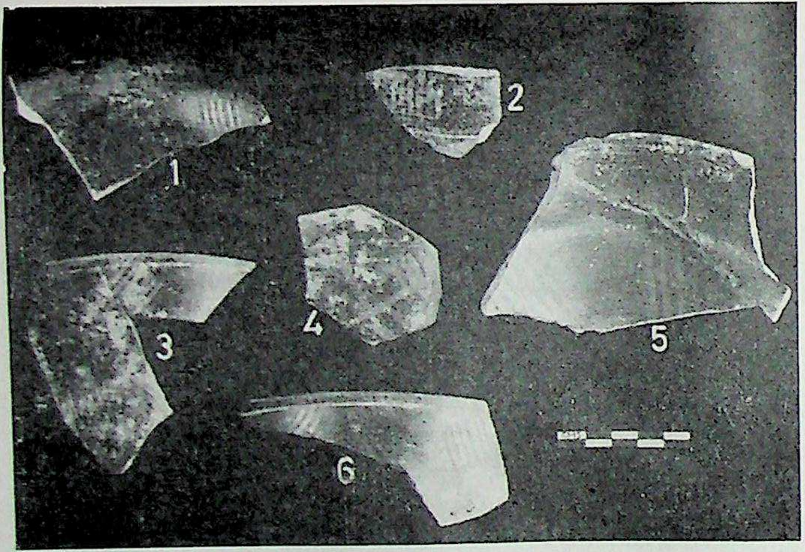


C. Black-and-red ware bowl and grey ware pot (overlap phase)

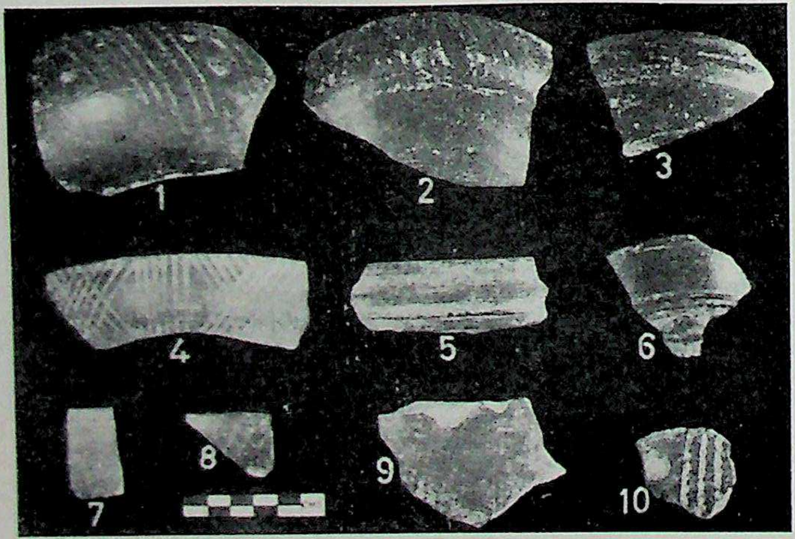


D. Black-and-red ware (Early Iron Age)

PLATE VII



A. Black-and-red ware—white painted (Early Iron Age)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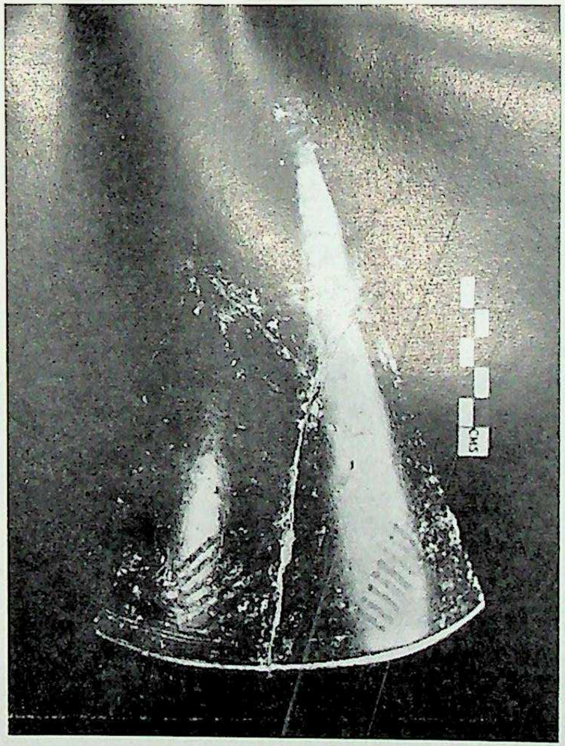
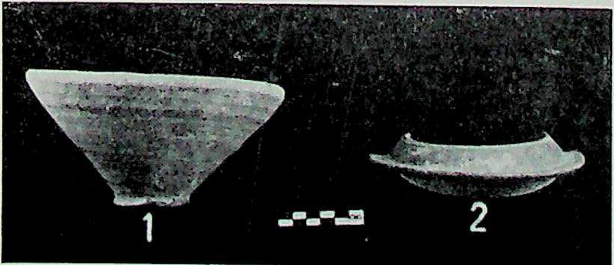
C. Russet-coated painted ware (Early Historic)

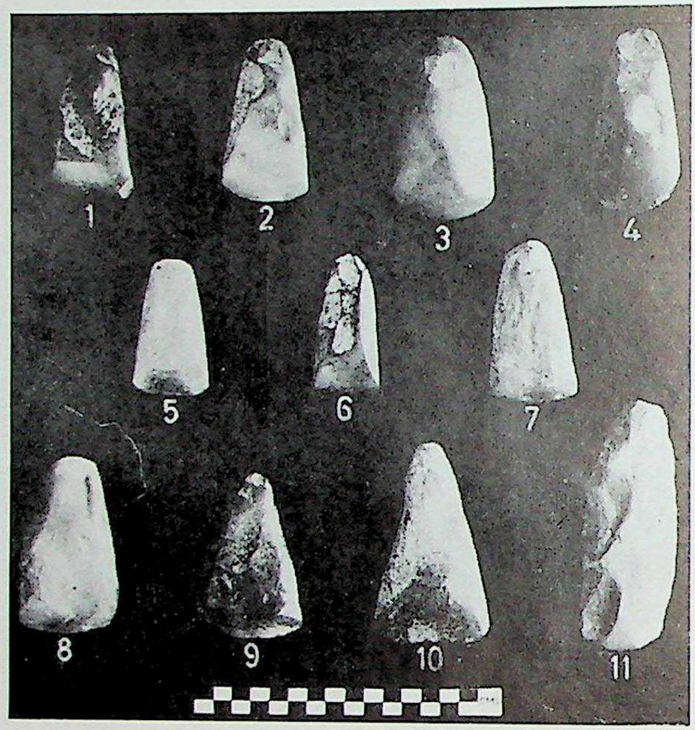


B. Conical lid or bowl—white painted (Early Iron Age)



D. Red ware (Early Historic)

PLATE VIII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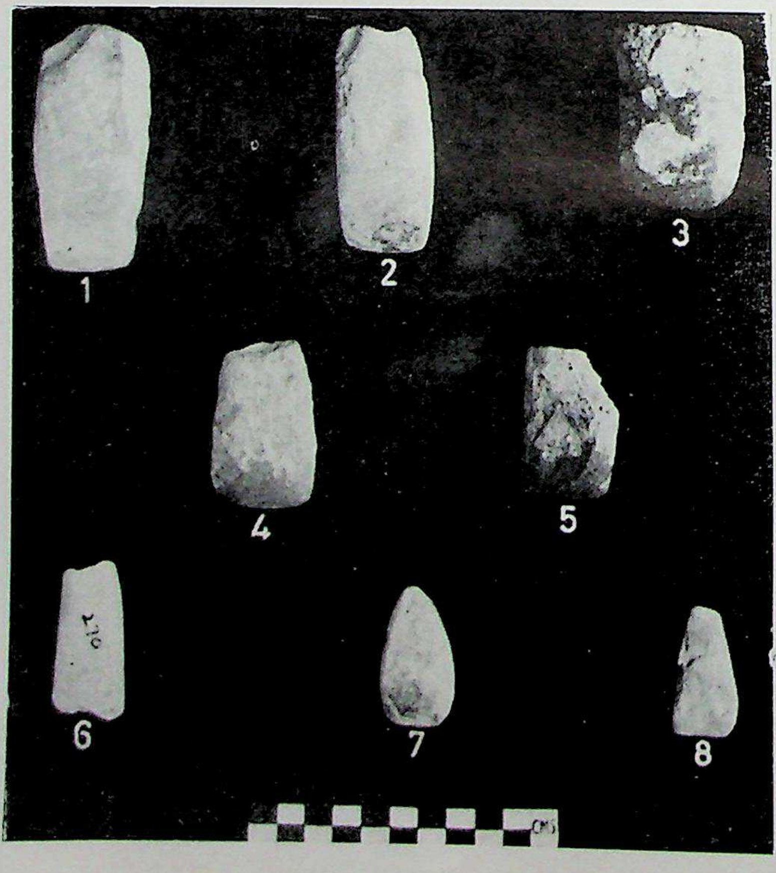
A. Polished Stone Axes and Adzes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B. Chisels

PLATE IX

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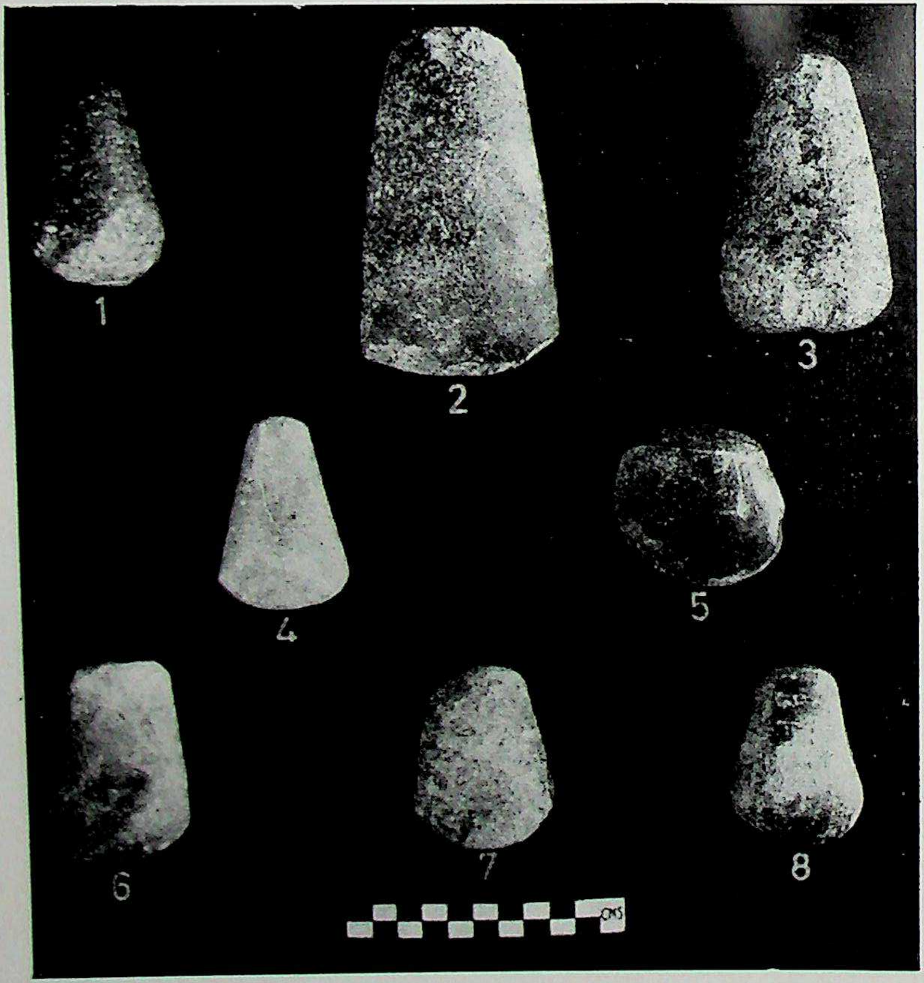
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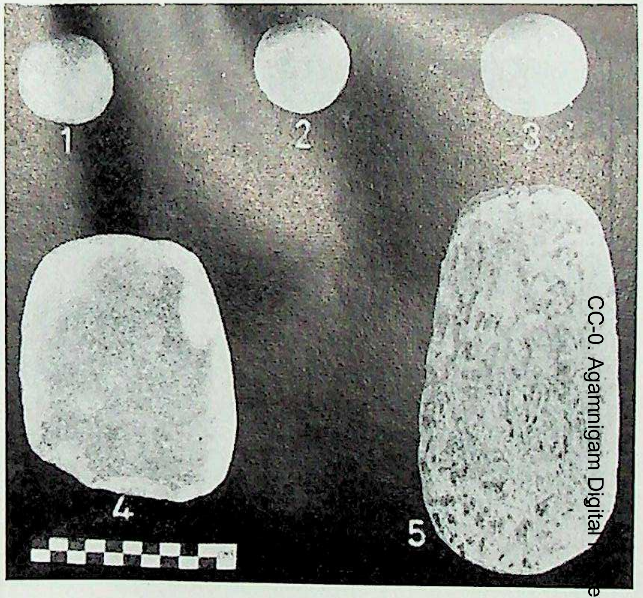
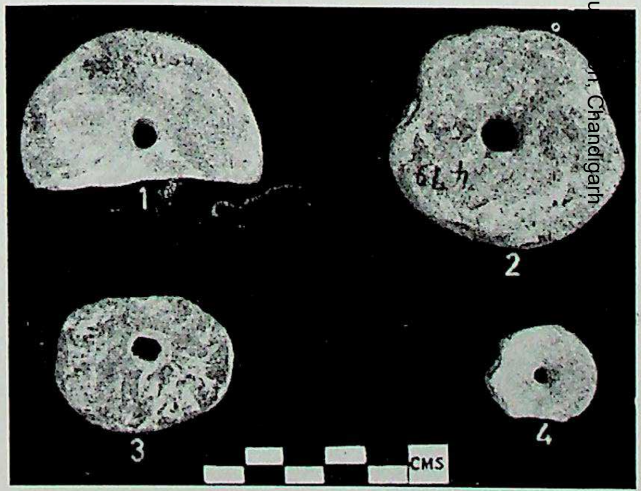
A. Hammers and wedges



B. Spheroidals and Rubbers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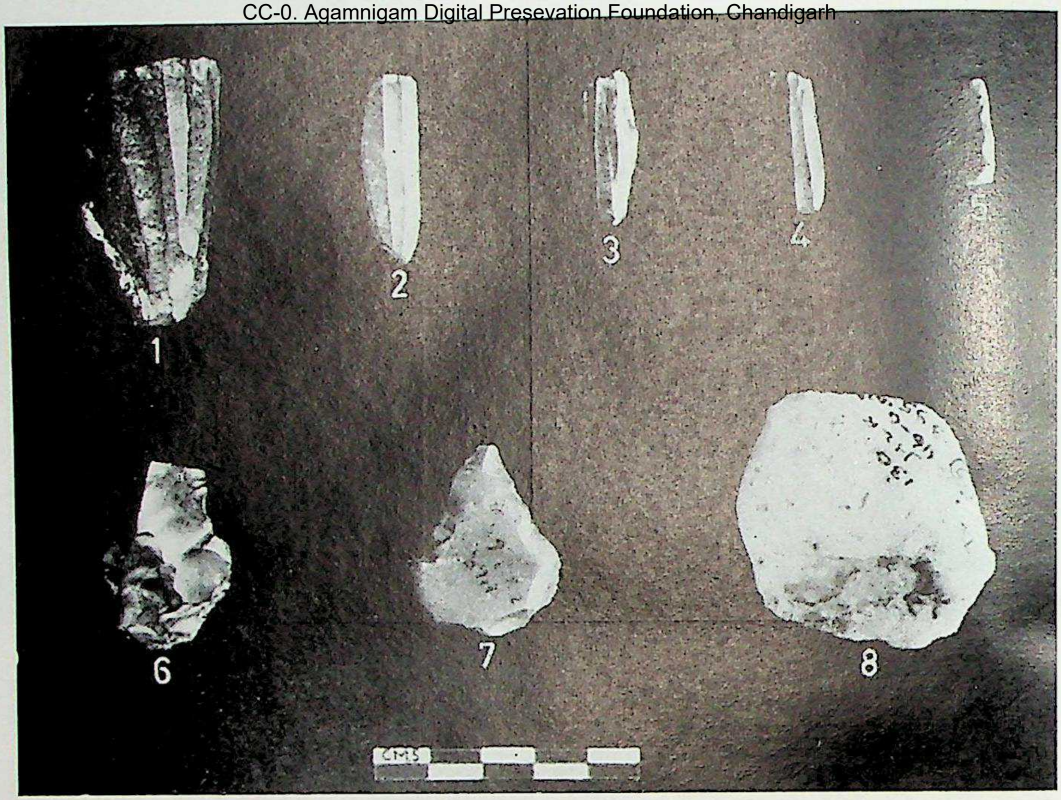
C. Stone discs—perforated

PLATE X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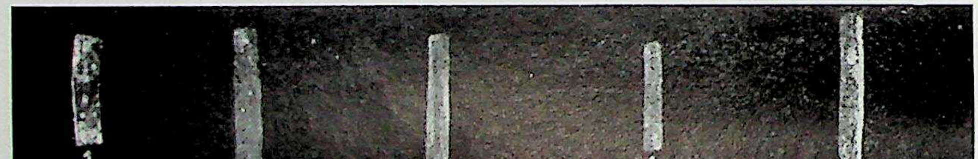
A. Fluted cores, crested ridge flake and scrapers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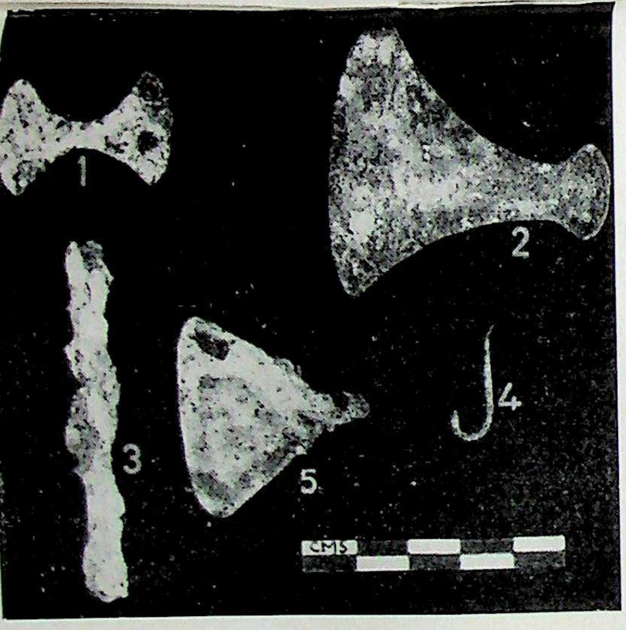
B. Parallel-sided blades, saw blade, points, lunates, etc.



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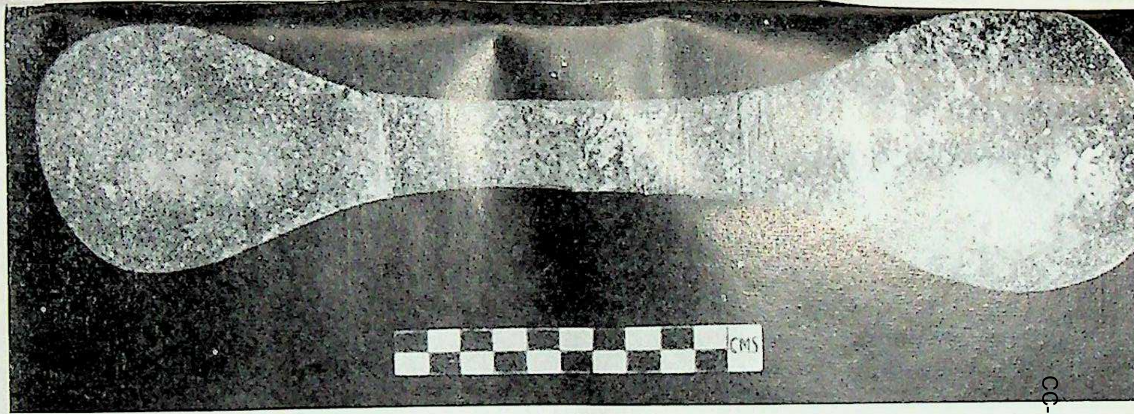

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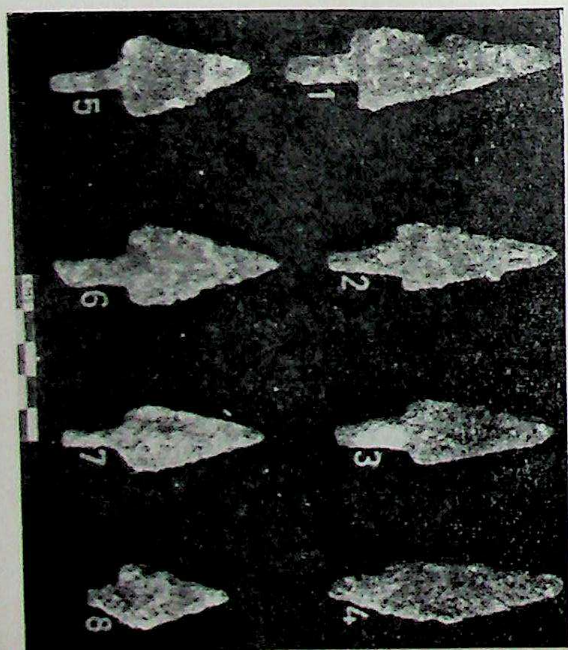

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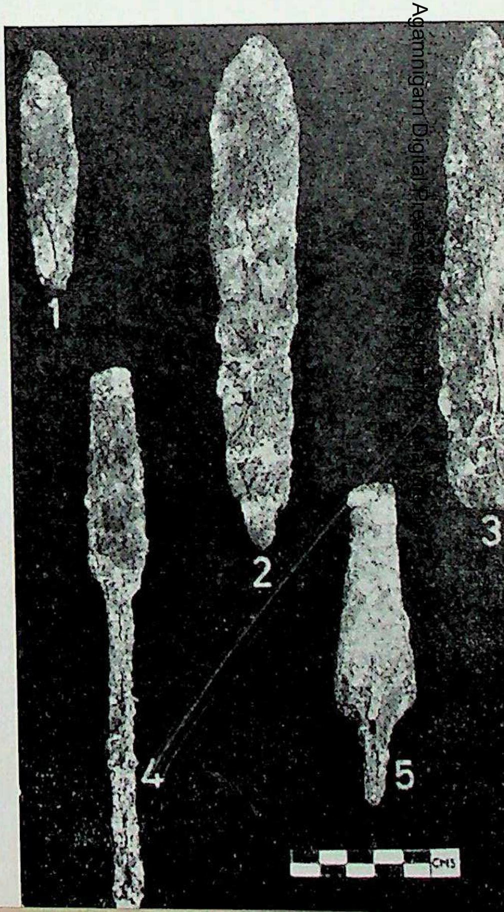

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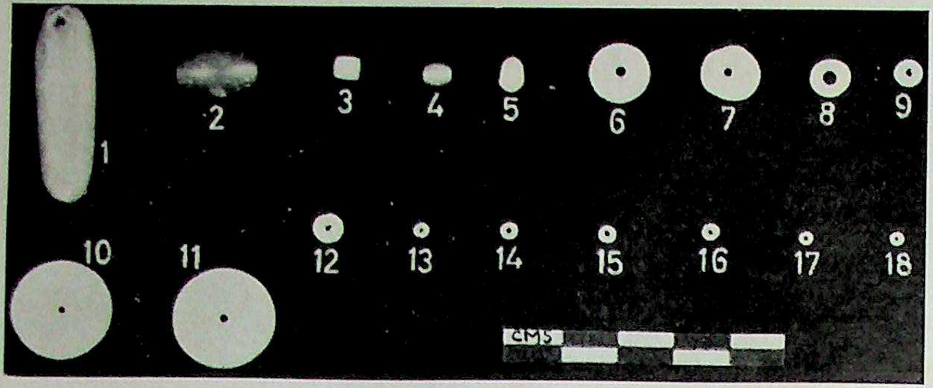
PLATE XI

A. Copper Implements
B. Copper Ladle
C. Iron Arrow-heads
D. Iron Daggers and Spearheads

PLATE XII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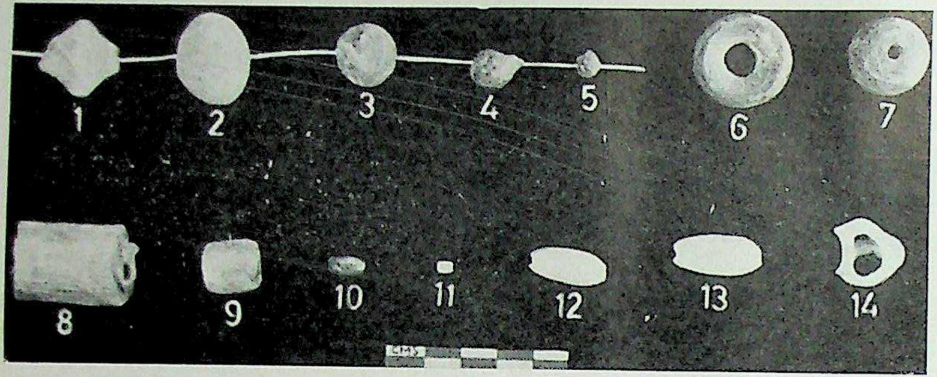
A. Beads—Terracotta, bone and shell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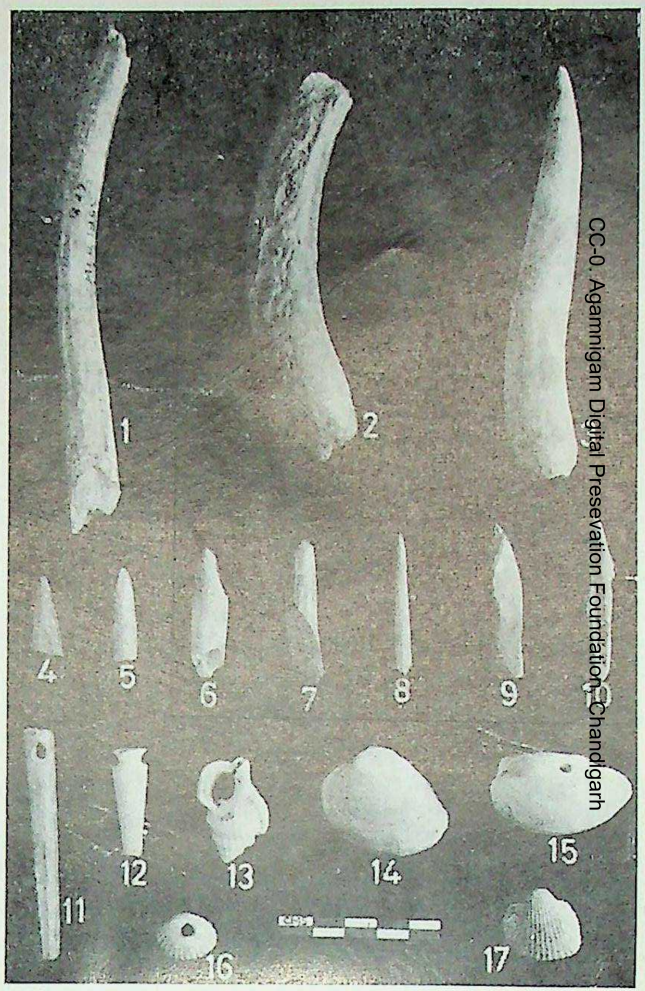
B. Beads—Green stone, carnelian, shell and steatite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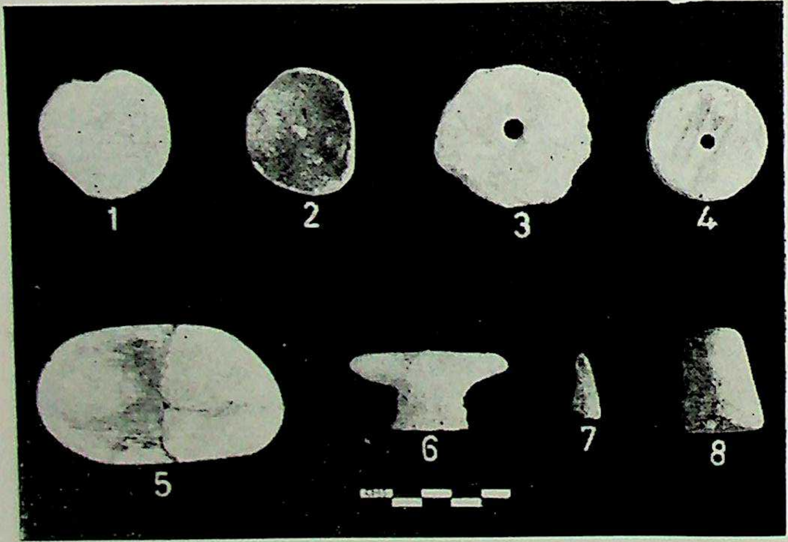
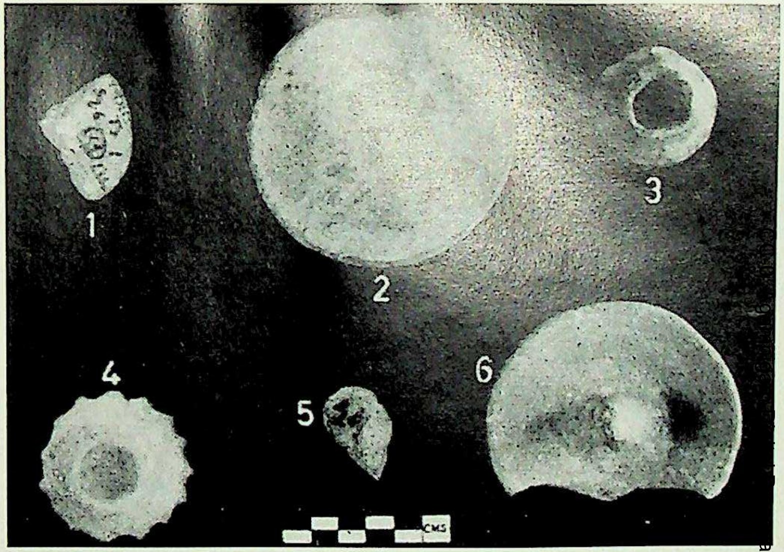
C. Antlers, bone points and shells

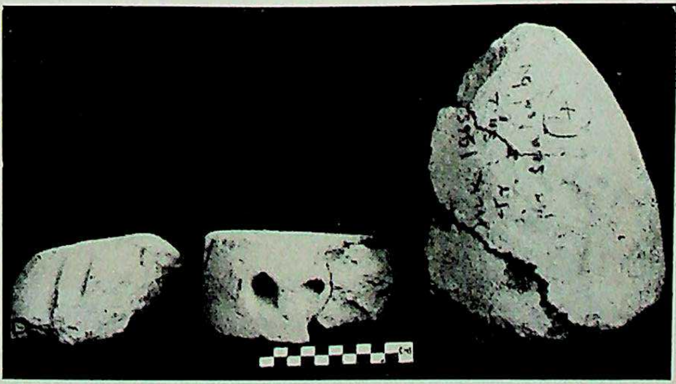
PLATE XIII



A. Terracottas—Edge-ground and perforated sherds

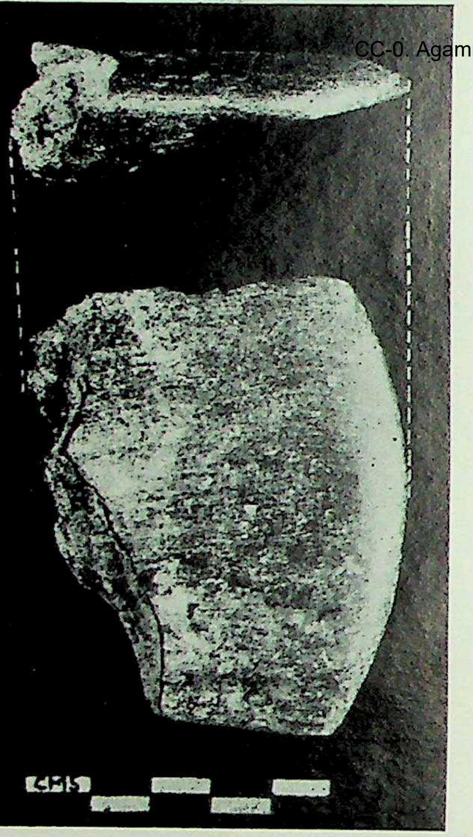


B. Lids

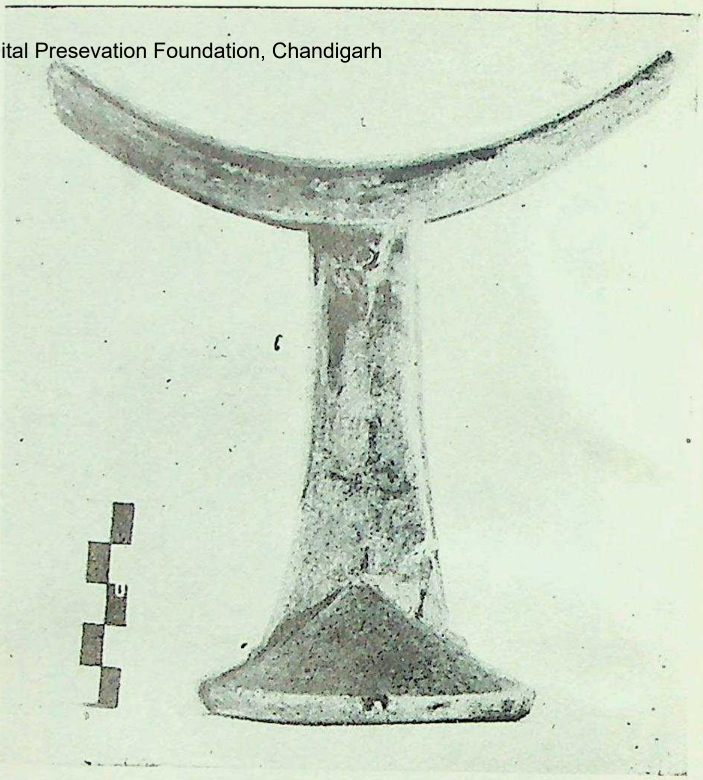


C. Terracotta pot-rest, brick-like and conical objects

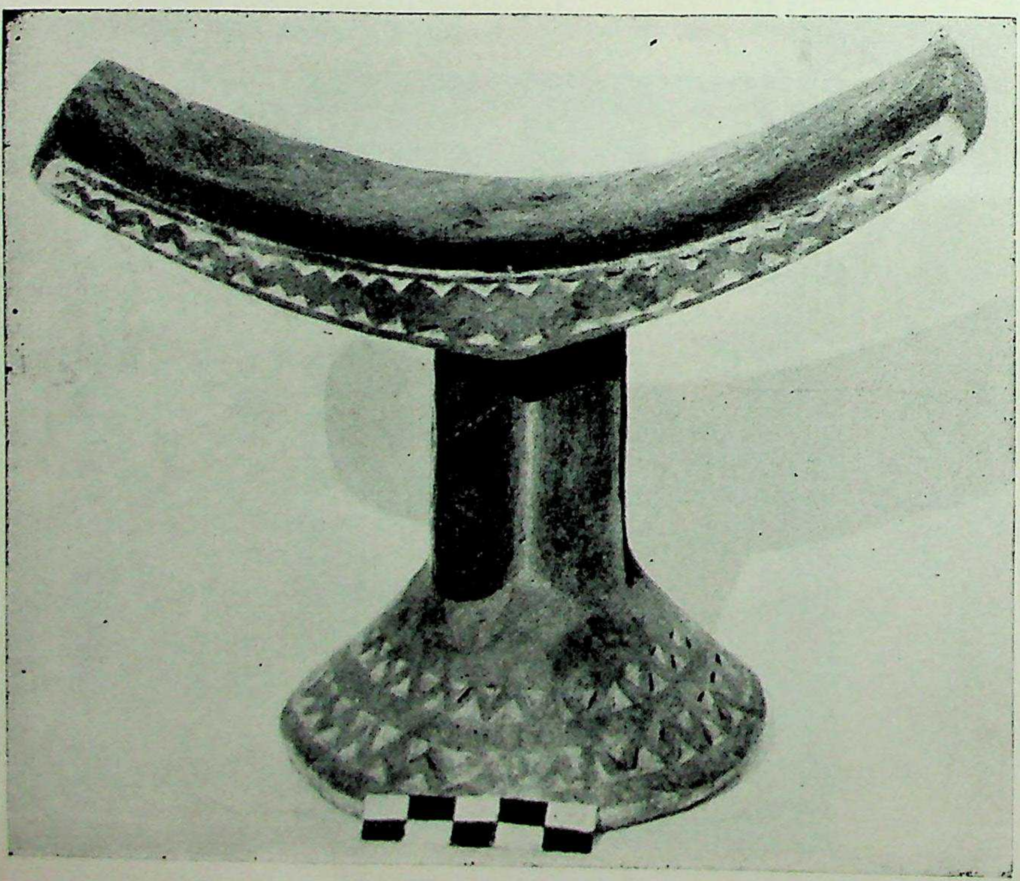
ATE XIV



A. Pottery head-rest



B. Wooden head-rest (Egyptian) Courtesy : National Museum, Warsaw



C. Modern wooden head-rest (African) Courtesy : Ethnography Museum, Warsaw

F. TERRACOTTAS

Quite a number of terracotta objects have been recovered from the excavations. Most of them are lids which have been considered under pottery. The others are edge-ground, oval potsherds, and perforated pottery discs. A few applique fragments have also been found. A couple of objects which look like applique horns, probably of figurines of bulls are also found. The only object which deserves comment is the fragment of a pottery head-rest. Terracotta figurines are conspicuous by their absence, whereas they are found in quite a good number in the sites of Tekkalakota (Nagaraja Rao & Malhotra, 1965, p. 81) and Sanganakal (Ansari & Nagaraja Rao, 1969, p. 19; and Fig. 11A & B on p. 18).

The following specimens are illustrated:

1. Fragment of a head-rest. Half portion of the upper part of the rest, made of burnished, grey ware. The stem and the base are missing. Found on the floor of the circular structure No. 1 (Pl. XIVA, Fig. 26, No. 1). Tr. 1, Layer 9, Period I, phase 2.

Pottery 'neck-rests', as they were originally designated by Foote, were first reported by him from the site of T. Narsipur on the Kaveri (Foote, 1916, p. 69, & pl. 23, 234, 128). But so far their actual use and significance were not known. But the excavations by Dr. Seshadri, at the same site have shown that they were used for sepulchral purposes. At T. Narsipur, a head-rest was found placed in a burial, near the temple of the skull (*IAR*, 1961-62, pl. LVIIA). Thus the use of these head-rests was sepulchral. Some more examples have also been found from the habitational layers at Hemmige (*IAR*, 1964-65).

This is further confirmed by the fact that in ancient Egypt, such head-rests were found in the royal burial chambers from predynastic times down to the Roman period. They are made of wood (Pl. XIVB), stone and sometimes pottery (Petrie, Sir F., 1927, pp. 33-66).

In the tomb of Tut-Ankh-Amen, four head-rests were found in a table-shaped cabinet. They were of ivory, carved & tinted ivory, lapis lazuli, blue faience and turquoise blue glass (Carter, 1933, Vol. III, pls. XXXVI, A & B;

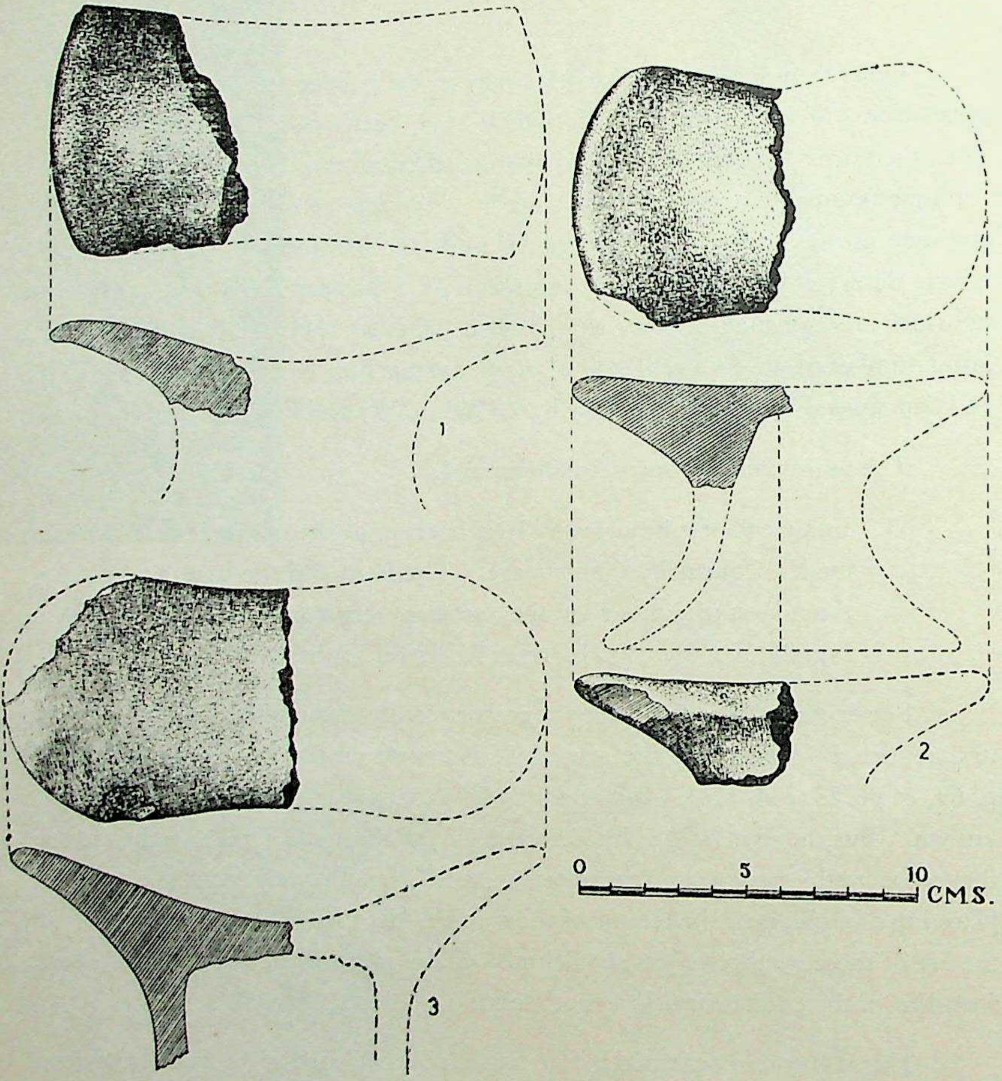


FIG. 26. Head-Rest Fragments.

1. Hallur Specimen.

2–3. Specimens from T. Narsipur, Surface finds (Author's Collection).

LXX, A & B). The finest of these is of ivory, now in the Metropolitan Museum of Art, New York (Carter, 1933, Vol. III, Pl. XXXVI, B, p. 116; see also Chenry, 1963, p. 147) and resembles in shape the specimen from T. Narsipur. The caryatidal figure of *Shu*, the god of atmosphere, represented on the stem, holds the concave part of the rest high. The myth it represents is that god *Shu* is supposed to hold the head of the king high which lies on the concave part of the rest so that he might rest in heaven for ever. Thus the significance of the head rest is proven for certain.

The similarity in shape and association of the pottery head-rest with the burial not only clarifies the purpose of the head-rests, but indicates the possible contacts with Egypt of 1400 B.C. (Nagaraja Rao, M.S., 1970, pp. 141-148). If the kings of Egypt could afford rests of precious material, the rural neolithic folk of Karnataka could have, at least, the earthen rests. But the remarkable feature is the similarity of the tradition. Two head-rests have been reported from Chanhudaro (Mackay, E. J. H., 1943, pls. LXXXIX, 3 and XCII, 38, p. 25 and p. 220), from Jhukar levels (c. 1700 B.C.). But the form and decoration of these pieces are, however, quite unlike the Hallur or T. Narsipur examples.

Allchin (1960, p. 16) refers to curious objects bruised on the rock faces near site VII which appear like offering stands and says that they could also be interpreted to be head-rests similar to the T. Narsipur specimens (Allchin, 1966, p. 60, fig. 2). Wooden head-rests are still said to be in use in some of the Southeast Asian countries. But in Africa many tribes such as the Makabanga and Maszona tribes of Southern Rhodesia, and the Balubas of Congo still use wooden head-rests (Korabiewicz, W., 1966, pls. 100 and 112).[1] *cf.* Pl. XIV c.

Edge ground potsherds

Of the edge ground potsherds, there are two specimens, both from the earliest layer. One of them is a complete oval potsherd, belonging to a concave-sided bowl. It is illustrated.

1. Edge ground, oval potsherd of a concave-sided bowl of pale grey ware. Part of the rim is still remaining which is painted with red ochre (Pl. XIIIA, No. 5). Tr. 1, Layer 14. Period I, phase 1.

Similar potsherds have been found in almost all the neolithic-chalcolithic sites of the Deccan such as at Nevasa (Sankalia *et al.*, 1960, p. 381), Maski (Thapar,

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[1] Thanks are due to Dr. Jadwiga Lipinska, National Museum, Warsaw, for the references.

1957, p. 110), Tekkalakota (Nagaraja Rao & Malhotra, 1965, p. 83) and Sanganakal. They have been variously described as sharpeners, skin rubbers, etc. However, none of them show any marks of use. Therefore, it is not possible to say anything conclusive regarding their use.

Perforated Discs

There are six potsherds which are perforated. All of them come from the overlap phase, i.e., Layers 4 and 5. They are all circular potsherds. Two of the specimens are illustrated.

1. A circular potsherd with the edge cut to a round shape and a perforation made at the centre. Made on coarse, dull brown ware. Neolithic fabric (Pl. XIIIA, No. 3). Tr. 1, Layer 5, Period II.
2. A perfect circular disc with well ground edge, and a perforation at the centre; made on black-and-red ware. Iron Age (Pl. XIIIA, No. 4), Tr. 1, Layer 5, Period II.

Similar perforated discs made on schist stone have also been found in this site and are described under stone objects (Pl. IXC, Nos. 1-4). Generally, those perforated discs, found in other proto-historic sites, are described as spindle whorls. However the perfect discs with perforation in the centre show that they could also possibly have been used as wheels of small toy carts.

Unpierced pottery discs

There are three specimens. Two are illustrated.

1. A circular disc of a thick, red ware sherd. Edge ground (Pl. XIIIA, No. 1), Tr. 1, Layer 3, Period II.
2. An almost circular disc of a thick brown-and-black ware sherd. Edge ground. An attempt is made to pierce a hole in the centre from the inner side (Pl. XIIIA, No. 2). Tr. 1, Layer 7, Period I, phase 2.

Miscellaneous:

The other miscellaneous terracotta objects are described here.

1. An uneven lump of terracotta probably intended to be made into a bead. Tr. 2, Layer 9, Period I, phase 2 (Not illustrated).

   A few terracotta beads of uneven shape, but with perforations, have been found in the site and are described under beads (Pl. XIIIA, Nos. 1-7).

2. A knob of a lid or an applique, hand-made and of brown ware (Pl. XIIIA, No. 6). Tr. 2, Layer 7; Period I, phase 2.
3. A small conical terracotta, in all probability, a horn of a bull (Pl. XIIIA, No. 7). Tr. 2, Layer 9, Period I, phase 2.
   Incidentally, this is the only evidence of animal figurines.
4. A thin conical object, probably leg of a vessel (Not illustrated), Tr. 2, Layer 7, Period I, phase 2.
5. An applique object, probably decorated on storage jars, having horizontal and vertical incised cross-line on one side (Not illustrated). Tr. 1, Layer 7, Period I, phase 2.

Similar applique decorations are found on storage jars, found at Tekkalakota, Piklihal and other sites. At Tekkalakota, particularly the burial jars of the four-pot burial (Nagaraja Rao & Malhotra, 1965, pl. XIV) had applique chain pattern and at the termination, two applique knobs were attached.

6. A terracotta stopper, made of red ware. Tr. 1, pit sealed by Layer 1 (Pl. XIIIA, No. 8). It comes from the disturbed deposit and therefore, could be of early historic period.

Three more objects are worth noting. All of them come from the overlap phase. They are all well fired and have a smooth surface with a thick slip.

One is the top portion of a pot-rest (Pl. XIII C, 1). It appears to have had a broad base. The top has a depression to facilitate the resting of a pot with rounded base, and two vertical depressions on the sloping sides, probably to stop the excess water from accumulating in the depression and damage the base of the earthern pot.

The second one is a curious, circular brick-like object with flat top and bottom, and two cavities on the side where fingers can easily be inserted. This arrangement is surely to facilitate to hold the object. But what exactly the object is not clear (Pl. XIIIC, 2).

The third object is a heavy one with a flat base (Pl. XIIIC, 30). Again its identification is uncertain.

Besides these, a few conical earthen objects were found. They resemble in shape the base of conical vessels illustrated in Fig. 17, No. 19. They appear to be the moulds on which such conical vessels seem to have been formed. Unfortunately these objects crumbled to powder.

G. BONE & SHELL OBJECTS

Although the title of this section indicates only bone and shell objects, horny objects such as antlers are also included in this. Majority of the bone objects are tools, while the shell objects are mostly decorative ones.

Bone objects and antlers

The following objects were recovered from the site.

Period I. Phase 1.

1. A point made on a splinter. It is slender and ground to a sharp, pointed tip. Tr. 1, pit sealed by Layer 13 (Pl. XIIC, No. 8; Fig. 25, No. 13).
2. An antler. Tr. 1, Layer 14 (Pl. XIIC, No. 1).
3. An antler. Tr. 2, Layer 11 (Pl. XIIC, No. 2).

Phase 2

4. An antler, the tip of which is finely ground to a sharp point. Tr. 1, Layer 10 (Pl. XIIC, No. 3). Village cobblers are said to use such antlers with ground end for leather working.
5. A finely ground point made on bone. Lower end broken. Tr. 2, Layer 10 (Pl. XIIC, No. 4). *cf.* TKT, Fig. 30, c.
6. A point made on a fragment of a bone, well ground. It is in the process of being made into a sharp point. Tr. 1, Layer 8 (Pl. XIIC, No. 6).
7. A point, ground to a sharp tip, made on a splinter of bone. Well ground. Tr. 2, Layer 9 (Pl. XIIC, No. 7).
8. A point made on a splinter of bone with the sides ground to get a pointed tip. It could have been used for burnishing or rubbing. Tr. 1, Layer 7 (Pl. XIIC, No. 9; Fig. 25, No. 14).
9. A point made on a splinter of a metacarpal bone of cattle. The end is ground all round to obtain a pointed tip. Tr. 1, Layer 9 (Pl. XIIC, No. 10; Fig. 25, No. 10).

10. A long pendant, made on bone with hollow body, and is well ground. A perforation is effected at one end, as in a flute. Possibly a pendant. Tr. 1, Layer 7 (Pl. XIIC, No. 11; Fig. 25, No. 16).

Shell objects

11. A shell with the edge cut (unground), but the head well ground, probably with the intention of making a perforation and to use as a pendant. Tr. 1, Layer 7 (Pl. XIIC, No. 14).
12. A shell with cut edges and perforation at the top which has a ground surface. Probably used as a pendant. Tr. 1, Layer 7 (Pl. XIIC, No. 15). Both these shells belong to veneridae family of pelecypoda class of shells.
13. A shell, edge ground and having two perforations. Probably used as a pendant. Tr. 1, Layer 10 (Pl. XIIC, No. 16).
14. A shell, with edge ground. Tr. 1, Layer 10 (Pl. XIIC, No. 17).

Both these specimens belong to the archidae family of pelecypoda class of shells.

A couple of shells belonging to olividae family and gastropoda class, have been used as beads by grinding the edges. They are described under beads (Pl. XIIA, No. 12, 13).

Disturbed deposit

The top 3 layers which constitute the disturbed deposit have yielded three objects.

Bone tool

15. A highly ground bone point, ground all over to a pointed tip. The lower end is broken. Tr. 1, Layer 3 (Pl. XIIC, No. 5).

Shell objects

16. A pendant made on the core of a conch shell of conidae family. It is well ground and a groove is made at the top. Tr. 1, Layer 1 (Pl. XIIC, No. 12).
17. A small conch shell belonging to cymatiidea family and gastropoda class. Tr. 1, Layer 1 (Pl. XIIC, No. 1).

ANIMAL REMAINS

A. Shells (invertebrata)[1]

Fresh water mussels, the species of which cannot be definitely identified, occur in the deposits of the site. They appear to have been collected in the river beds of the Tungabhadra. These shells have been used for preparing pendants. Such decorative objects of shell have been found in various excavated sites such as Brahmagiri (*AI*, 4, p. 265; pl. CXIX, 36), Maski (*AI*, No. 13, p. 104, pl. XXIXB), Piklihal (Allchin, 1960, p. 110) and Tekkalakota (Nagaraja Rao & Malhotra, 1965, pp. 80-87, pl. IX, Nos. 16-25 and pl. X, Nos. 5, 8-12). They may also have been used as edibles as suggested by Allchin (1960, p. 115). Even to-day, the coastal people use contents of these shells as a delicacy.

The following classes of shells are found.

Invertebrata

Phyllum : Mollusca
Class : Pelecypoda
Order : —
Sub-order : —
Family : Veneridae
Genes : —

A couple of specimens of this variety of shells have been found. They are used to make pendants, by grinding the top and effecting a perforation. They are described under shell objects and illustrated (Pl. XIIC, Nos. 14-15).

Order : —
Sub-order : —
Family : Archidae
Genes : —

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[1] My grateful thanks are due to Prof. R. N. Desai, Dept. of Zoology, Karnatak College, Dharwar, who readily took me to the Zoology Dept. Museum and helped me in identifying the various shells—M. S. N.

Two specimens of this family have been found. They are also used for making pendants as the above two examples. Both are described under shell objects and illustrated (Pl. XIIC, Nos. 16-17).

Phyllum : Mollusca
Class : Gastropoda
Order : —
Sub-order : —
Family : Cymatiidae
Genes : Cymatium

One specimen of this family is found (Pl. XIIC, No. 13).

Family : Corsidae

A pendant is made from the core of a conch shell of this family. The other details cannot be made out as it is well ground and the distinctive features are lost (Pl. XIIC, No. 12).

Family : Murisidae
Genes : Thais (?)

A pendant is made on a small conch shell of this family. The genes of this specimen is not certain (Pl. XIIA, No. 14).

Family : Olividae
Genes : Oliva

Two shells of this family are found. Their edges are ground to make them into beads (Pl. XIIA, Nos. 12-13). Such shells are found to be used as beads, often by grinding the edges, at Tekkalakota (Nagaraja Rao & Malhotra, 1965, pp. 88 and 86; pl. IXC, Nos. 16-25).

ANIMAL REMAINS

B. *Skeletal* Remains (*Vertebrata*)

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INTRODUCTORY

Very recently I had an opportunity of studying the animal bones from the excavated site of Sanganakal, a neolithic site in Bellary district, by the courtesy of Dr. M. S. Nagaraja Rao, Curator of the Museum of Art and Archaeology, Karnatak University, Dharwar, who brought them to my notice. It is in furtherance of my association with him, that he asked me to examine and sample the animal remains from the site of Hallur.

Hallur is the border village in the Hirekerur taluka of the Dharwar district in Mysore State. It is located on the left bank of the river Tungabhadra. This river has already yielded the fossil remains of prehistoric animals (*IAR*, 1963-64, p. 24). The site of Hallur was excavated by Dr. Nagaraja Rao during February--March 1965.

The excavations of two trenches showed that the earliest occupation of the site was during the neolithic period, circa 1800 B.C. The excavator has distinguished two cultural periods. Period I, which is designated 'neolithic', has been subdivided into two phases, based on the ceramic evidence. The earliest phase is 'neolithic', characterised by handmade pottery and few ground stone tools; Phase 2 has been called 'neolithic-chalcolithic'. It is distinguished by the occurrence of handmade pottery, large number of polished stone tools, a new stone blade industry and tools of copper. House plans and burials are other features worthy of note.

Period II is called the Early Iron Age, although some of the earlier elements continue. The new elements which distinguish this period are the typical highly burnished black-and-red ware pottery, with white painted variety and the iron implements.

The carbon-14 determinations for the latter period show that the Iron Age could be ascribed to circa B.C. 1000; and according to the excavator, the earliest phase of the neolithic chronologically falls to circa 1800 B.C., and the second to about 1500 B.C.

Collection and labelling

Two trenches have been excavated at the site. The bones are collected from Trench Nos. 1 and 2 separately, and packed as found from each layer. Each label mentions the date of collection, depth at which collected, with a short description of the contents. Third phalanges (hoof bones) are separately sorted and labelled.

From Trench No. 1, one set of bones are collected from Layer No. 4, three sets from No. 5, one each from 6 and 7, two from 8, two from 10, and one each from 12, 13 and 14. From Trench No. 2, one set of bones are collected from each layer Nos. 3, 4, 5, 8, 9 and 10.

Condition of the bones collected

The bones collected are mostly fragments except a few small bones, as in many other sites (Bholanath, 1957, p. 121 and 1962-63, p. 154; Allchin, 1961, p. 54). Many of the bones are well preserved and bear a grey encrustation of earth around them, which can be washed off, after maceration. Some of the bones are hydroscopic, which may be due to the dissolution of the external compact layer, and subsequent infiltration of its spaces by earth, as they were in a buried condition for a long time. Some bones have not even lost the smooth exterior of the compact layer. A few bones have become heavy, while others have become light and porous. This may be due to the favourable conditions present in the subterranean soil, either for fossilation or for disintegration. Few of the segments are either charred or roasted.

Method of examination and report on the bone collection

For purposes of examination, bones from the two trenches at different layers, are grouped together into periods I and II on phase characters indicated by the excavator. I have also followed the same. Each bone is given a number which is marked on its surface; then identification charts are prepared for each phase. These charts describe the bones and show the identification of the animals they represent. At the end of the chart, notes are written mentioning the peculiar features which the bone exhibits.

Period I

It is subdivided into two phases.

Phase 1

Bones from Trench No. 1, Layer 12, 13, and 14, are included in the study of this phase. There are no bone collections from Trench No. 2.

Phase 2

Bone collections from Trench No. 1 of Layer No. 8, 9, and 10, and from Trench No. 2 of Layer 8 and 9, are grouped together.

Note:—Bones from Layer 10 of Trench No. 1 are mixed with those of Layer 10 from Trench No. 2, through oversight.

Period II

Bone collections from Layers 4, 5, 6, and 7 from Trench No. 1, and Layer 3, 4, and 5 from Trench No. 2, are grouped together, for the purpose of study and identification.

Disturbance

There are no bone collections from Trench No. 1, in Layer 1, 2, and 3, and Trench No. 2, in Layer 1.

Chart showing the Provenance of Bones Numbered and Cultural Periods

Trench	Layer Nos.	Bones	Cultural Periods
1	4	1–24	
,,	5	25–119	Period II
,,	6	120–145	Early Iron-Age
,,	7	146–192	
2	3	193–212	
,,	4	213–255	
,,	5	256–288	
1	8	289–357	Period I, Phase 2
,,	9	358–397	Neolithic-Chalcolithic
,,	10	398–486	
2	8	487–507	
,,	9	508–528	
1	12	529–601	Period I, Phase 2
,,	13	602–628	Early Neolithic
,,	14	629–642	

Note:—Layers 1, 2, 3 of Trench 1, and 1 and 2 of Trench 2, are disturbed deposits.

Bone-wise Identification of Animals

Period I — Phase No. 1 (Neolithic)

Description	Cattle	Sheep & Goats	Swine	Antelope	Canine
Mandible	4				
Teeth (molar)	12		1		
Antler				(2)	
Atlas	1				
Vertebrae (General)	4				
,, Lumbar	1				
,, Coccygeal	1				
Rib	1				
Scapula	1				
Humerus	3				1
Radial carpal	1				
Intermediate carpal	1				
Ulnar carpal	1				
2nd & 3rd fused carpal	1				
Metacarpus	6				
1st phalanx	11	2			
2nd ,,	8				
3rd ,,	8	1			
Femur	1				1
Tibia	7				
Tibial tarsal	7				
Fibular tarsal	4				
Central 4th tarsal fused	3				
Metatarsus	1	1			
Miscellaneous bits	18				
				Total	115

Note:—The figures given under the animals, indicate not the number of animals, but their bone segments.

NOTES ON BONE SPECIMENS OF PHASE 1

Sl. No. 546 (*Pl. XV, A*2)

This is a molar of the swine, along with the included maxilla. There is one permanent molar, while the second is deciduous, and is still in the alveolus. The animal bearing this molar is still to become adult.

No. 332 *and* 453

Note:—These numbers are from the Antiquity Register maintained at the Kannada Research Institute of the Karnatak University, Dharwar. They are described here as they belong to this phase.

These two (Pl. No. XII C, 1 & 2) are segments of the antler, broken off from both the ends.

No. 332 measures 15.1 cm., excluding the slight curve and is 2 cm. wide at its base. The external surface is made smooth and longitudinal ridges are rounded off.

No. 453 is comparatively short and stout, and has become fossilised. It measures 11 cm. in length, and is 2.5 cm. wide at its base. The external surface bears grey encrustation, and the grooves and ridges are prominent.

Note:—Both the specimens have developed smoothness associated with handling. Probably they were used by the people as instruments.

Bone-wise Identification of Animals

Period I Phase No. 2 (Neolithic-Chalcolithic)

Description	Cattle	Sheep or Goat	Horse	Antelope	Canine	Total
Teeth (molar)	45		1			46
,, (incisor)	2					2
Mandible	2	1				3
Frontal	2					2
Horn core (antler)				1		1
Atlas	2					2
Axis	1					1
Vertebrae (general)	16	1				17
Ribs	2					2
Humerus	4					4
Radius	3					3
Ulna	4	1				5
Radial carpal	6					6
Intermediate carpal	6					6
Ulnar carpal	4					4
Accessory carpal	1					1
2nd & 3rd Fused carpal						2
4th carpal						1
Metacarpus	12		1(?)			13
1st Phalanx	16				2	18
2nd ,,	27		1		2	30
3rd ,,	17	1				18
Sesamoid (proximal)	1					1
Femur	3					3
Tibia	5					5
Patella	1					1
Malleolus (distal)	1					1
Tibial tarsal	12	2				14
Fibular tarsal	2					2
Central & IV tarsal	5					5
Miscellaneous bits						22
						241

Note:—The figures given under the animals, indicate not the number of animals but their bone segments.

Examples of charred bones

Sl. Nos. 291, 336, 350, 378, 388, 394, 447, 462, 490, 492, 498, 502. All the above mentioned specimens are showing the character of roasting of different degree. Some of them bear the mark of roasting, only at one end; while others are roasted through and through. This would not happen in nature, by itself. On section, the charring can be seen only on the exterior, while the internal structure is unaffected. This indicates that these are cases of light roasting.

The above facts lead to the conclusion that the roasting or charring of the bones was for the purpose of extracting adhered flesh, for edible purpose.

Sl. No. 440 is a part of the shaft of a long bone. It is classed under the miscellaneous bits, in the list of identification of bones of Period I, Phase 2 (chalcolithic). This is the only specimen of cremated bone, in the whole collection. It has developed a typical light blue shade, with bleach white complexion. The circumstances under which it has undergone cremation process is still to be ascertained.

Sl. Nos. 358-359 (*Pl. XV, B* 1 *&* 2)

These are the horn cores (*processus cornus*), of large sized cattle. They carry along with them part of the frontal bone, and clearly indicate the contained hollow cavity (*cornual diverticulum*), with intersecting bony plates. They measure 14.0 and 15.4 cm. in length, and have 14.8 and 15.1 cm. of circumference at the neck region. The tips of both cores are broken off.

Note:—This is the first time that such long horn cores are noticed. The main object in mentioning these is that there is reference to the effect that these are not encountered in the collection of animal remains.

Sl. No. 369 (*Pl. XV, D*2)

It is one of the bones of the tarsal joint (central and fourth tarsal fused) of cattle. It has anchylosed with the second and third fused tarsal. Usually, the cattle bones of the joints have no tendency to anchylose with each other, as in horse.

Note:– Anchylosis is a condition in which two bones unite with each other by the process of ossification. The cause for the same is inflammation and concussion. Animals subjected to heavy draft work, carry concussion to their joints, which gets inflamed. The membrane covering the joint bones, and the cartilages interposed between them, get converted into bone (ossified), and the movement essential to the smooth working of the joint ceases.

The conclusion from this would be that the animals having anchylosed joints, are those which are used for heavy draft work. Hence, the residents of Hallur used their animals for and were aware of agricultural operations. Anchylosis of the joint bones is a sequel to occupational hazards.

Sl. No. 517 (*Pl. XVI, B2*)

It is the second phalanx of the horse (equine). The specimen is well preserved in a state of burial, and the external compact layer is not much affected. From the size, it appears to belong to an animal of medium height.

Note:—The importance of this find is, that it is one of the few horse bones belonging to so early a period as neolithic-chalcolithic, which is identified. Besides, the counterpart of this bone in cattle bears no resemblance to this. So, it is an unmistakable bone of the horse tribe (*equine*).

Sl. No. 500 (*Pl. XV, D1*)

It is the patella of the cattle. Patellar bones are not usually recovered in bone collections from excavtions, which may be due to its content of cartilage, liable to dissolution.

Sl. No. 467 (*Pl. XV, B 3 & 4*)

It is the proximal extremity of the metacarpal bone of horse. The small metacarpal placed along the lateral border has got detached. The articular head of the large metacarpal bone is splintered. Hence only a part head is available. It is for this reason, the bone is classed as probably belonging to equines.

Sl. No. 496 (*Pl. XVI, B1*).

It is the molar of horse, from the middle of the series. The rings of the enamel are double folded inside and the two cups are clearly visible. Though the molars of cattle and horses are identifiable, yet in certain locations, they may be confounded. Hence the specimen is classed as probably belonging to horse.

Sl. No. 351 (*Pl. XV, A*4)

This is a molar tooth. It presents a crown and three roots, of which one is broken. The masticatory surface of the crown is sufficiently worn out. The stump and the root, together are curved.

Note:—In comparison with the molars of the present-day animal, it has the characters of both the horse and cattle. The molar of cattle is not curved, while that of the horse, has not only double layer of enamel, but is arranged in a double folded cuplike manner. As there is no record of the evolutionary changes, in the teeth of either the cattle or horse, this specimen may be a link between the ancestral and the modern molars. Similar teeth have been recorded, in other excavations.

Sl. No. 456 (*Pl. XII, C*3)

(Number from the antiquity register maintained at the Kannada Research Institute of the Karnatak University, Dharwar.)

This is an antler measuring 12 cm. in length, and 2 cm. wide at the base. It is slightly spiral in shape, with a sharp pointed projection. The external surface is ground, and the point is made to a smooth finish. The base is carved, to wedge in a round object. The surface has got cracked, either at the time of the workmanship or at the time if its forceful use. The smooth polish associated with handling indicates that it was used as a bone tool.

Bone-Wise Identification of Animals

Period II Early Iron Age

Description	Cattle	Horse	Sheep or Goat	Fowl	Swine	Canine	Total
Teeth (molar)	35						35
Mandible & Maxilla	8				2	1	11
Horn core	1						1
Atlas	2						2
Vertebrae (general)	13		4				17
Ribs	12	1(?)					13
Scapula	1		2				3
Humerus	12		2	1		1	16
Radius	5		2				7
Ulna	4						4
Radial carpal	4						4
Ulnar carpal	3						3
2nd & 3rd carpal fused	4						4
4th carpal	3						3
Metacarpal	12		2				14
Small metacarpal		1					1
1st Phalanx	22		3				25
2nd ,,	17						17
3rd ,,	13		1				14
Acetabulum	2		1				3
Femur	6		2			1(?)	9
Tibia	2						2
Tibial tarsal	16						16
Fibular tarsal	10		1				11
Central & IV tarsal fused	9						9
Metatarsus	5			1			6
Miscellaneous bits							38
							288

Note:—The figures given under the animals, indicate not the number of animals, but their bone segments.

Sl. No. 239 (*Pl. XV, C* 2).

It is the proximal extremity of the femur of cattle, bearing an articular head which fits into the acetabulum of the inominate bone. The articular area of the head measures transversely 6 cm.

Note:—The average articular area on the head transversely, is about 4.5 cm.; hence it is much bigger than that of the ordinary animals (Pl. XVC, 4). This specimen has been mentioned to indicate that there were two breeds of animals, one large and another small.

Sl. No. 57 (*Pl. XV, C*1)

It is the distal extremity of the humerus. The condyle measures 8 cm. in width, and 4 cm. in height. The olecranon fossa is 6 cm. deep.

Note:—The average sized animal has an articular condyle which measures 6 cm. in width, 3 cm. in height and an olecranon fossa, 4.5 cm. deep (Pl. XVC, 3). The existence of a tall breed of cattle is already recognised by Dr. F. R. Allchin, along with dwarf animals (1960, p. 12 & 1963, p. 45).

Sl. No. 251 (*Pl. XVI, A* 1 *&* 2)

It is a part of the fibular tarsal. The process (*tuber calcis*) has been cut off by a sharp instrument, of the type of chopping axe. Two or three cuts are given on each side, to dislodge the process. A light cut is also given on the outside, 2 cm. below the point of detachment (Bhola Nath, 1963, p. 154).

Sl. No. 22 (*Pl. XVI, A*3)

It is a piece of bone the identity of which cannot be established. Hence it is classed as a miscellaneous bit. As it is a slit bone, only half of the longitudinal segment is available. On its outer surface, there are two marks, which appear to have been made by a blunt instrument. From the angle of convergence of the sides of the cut, it is inferred that the instrument used should have a wide base, probably made of stone.

Notes on specimens No. 251 *and* 22:—The cuts on these two bones are made objectively, as they exhibit a pattern and design. Such cuts are intended for taking out the edible marrow from the bones. This evidence is repeatedly found in other excavated material.

Sl. No. 212 (*Pl. XVI, B5*)

It is the small metacarpal (splint bone) of the horse, from the lateral side. It presents a triangular body, of which the anterior surface is rough, as it opposes the large metacarpal. The proximal head is smooth and articular, and bears a single facet. Below the head, there are two facets by which it is related to the main bone. The distal end which should present the button of the splint bone, is broken off in the specimen. It is one of the diagnostic bones of horse (*equine*) as it is peculiar to this species only. However, I am quoting below from a text-book on Veterinary Anatomy for reference, in which it is described as under.

"The proximal extremity is relatively large. In the case of the medial bone, it usually bears two facets above, which support the second and third carpal bones, while the lateral has a single facet for articulation with the fourth carpal. Each has also two facets for articulation with the large metacarpal, and is elsewhere roughened for the attachment of ligaments and muscles.

The shaft is three sided and tapers to the distal end.

The attached surface is flattened and is rough. . . . . ." (Sison and Grossman, 1962, p. 97).

Note:—Horse bones are a rare find in the animal remains from any excavation of so early a period, more so the diagnostic bones. General bones may evade diagnosis, as most of them are only fragments but are few. In this excavation, two confirmatory (Specimen Nos. 517 and 212) and one probable (Specimen No. 496) bones of horse are found.

Sl. No. 234 (*Pl. XV, A3*)

It is a part of the jaw which bears alveoli for molars. In one of them, there is an embedded broken molar, while the other two are vacant. In front of them, there is little interdental space, and is followed by another alveolus, probably for a canine tooth. The molar alveoli have a cavity for two roots. The species of animal to which this bone belongs, cannot be identified.

It is recorded, so that the collective information may be used to trace the stages of metamorphosis of the jaw and teeth.

Sl. No. 119 (*Pl. XV, D4*)

It is the metatarsus of the fowl, and measures 7.5 cm. It is a long bone with two extremities. The proximal extremity is articular and meets the tibial bone. The distal end bears three condyles. The body which is compounded of 2nd, 3rd, and 4th metacarpals, presents a pointed bony spur, at its distal one-third of the shaft.

This bone is described in the texts of Veterinary Anatomy as follows: "The metatarsii are three in number in the early stages of development. The adult tarso-metatarsus is represented by a single bone resulting from the fusion of the three bones (2nd, 3rd and 4th). The proximal extremity which is compounded with the tarsus, is very irregular and has two concavities for articulation with the tibia. The distal extremity is divided into three articular projections which support three principal digits. In the male, there is conical slightly curved projection at the distal third, which serves as support for the horny spur" (Chelva Ayanagar & Alur, 1964, p. 141).

Note:—Fowl bones are rare collections, in any excavation as they are too tender to resist putrefaction. Besides, many of them are pneumatic and hollow. This is the first excavation where I have come across the fowl bones. It is more surprising that not only a fowl bone is encountered, but the whole of it is well preserved, where long bones of large and heavy animals get distintegrated.

Sl. No. 41 (*Pl. XV, D*3)

This is the proximal extremity of the humerus of fowl. It is a fragment measuring 4.4 cm. On the medial surface it marks a pneumatic foramen, found on all long bones of the fowl. The medullary cavity is distinct and is subdivided by a partition.

SUMMARY

From the study of the above bones, it is clear that the following animals existed during the neolithic, chalcolithic and the Iron Age periods of occupation, on Hallur site.

During the early neolithic period, i.e., Phase 1 of Period I cattle, sheep and goats, antelopes, swine and carnivorous animals (probably dogs), were associated with the human habitation.

In the next phase, viz., the chalcolithic, the animal population seems to have increased; but cattle was still the dominant animal. Horse got associated, along with definitive canines.

In the next period of occupation, the Iron Age, the inhabitants seem to have developed animal husbandry methods, hence large sized animals were developed. Cattle population increased, along with sheep and goats. Fowls were introduced for the first time, in this period.

CONCLUSIONS

Animal remains of Hallur are truly representative, as far as domesticated animals are concerned. Cattle bones are the most predominant, indicating that these were the animals used both for cultivation of land and for draft.

The presence of bones of both small and large animals, is another indication that the animal husbandry practices were known. This fact is also noted in the reports of the previous excavations (*AI,* Nos. 18-19, p. 154). The anchylosis of the hock joint (Sl. No. 369) is a clear proof that the animals were used for heavy draft work. Regarding the use of animal flesh as an article of diet, enough evidence is available in the chopping of the bones and roasting them.

Horse (equine) is another animal whose existence is proved beyond doubt, by the find of the small metacarpal (splint bone) (Pl. XVIB, 5) and the second phalanx (Pl. XVI, B2). These were traced in the collections of Period I, phase 2, and Period II. The number of animals appears to be very few, as they are rare finds. Though doubtful identification has been made on the molars, this is the first time that confirmatory bones are traced.

Swines, either wild or domesticated, were existing in phase 1, of Period I, and also in Period II.

The find of fowl bones at Hallur is very interesting. This is the lone excavation in which they are identified. Besides, the find of a full metatarsus is not only a freak, but a compliment to the archaeologist for his diligent work in collection.

Though carnivorous bones are identified, their canine origin cannot be definitely ascertained.

ACKNOWLEDGMENTS

I have received valuable help and support from Dr. S. N. V. Ayyangar, Veterinary Officer of the College of Agriculture, in the identification of the bones.

Shri Huli, Agricultural Assistant, has patiently numbered serially all the segments. Thanks are due to the authorities of the Agricultural University and to Dr. S. W. Mensinkai, Director of Instruction, College of Agriculture, University of Agricultural Sciences, Dharwar, for providing the necessary facilities. My thanks are due to Dr. M. S. Nagaraja Rao, who has been the source of inspiration and help, in working out this problem. Dr. P. B. Desai, Director, Kannada Research Institute, Karnatak University, Dharwar, has provided all the technical assistance needed for writing the report. Shri R. S. Desai, Artist-photographer, has prepared the photographs of the selected bones skilfully and in the right perspective. My grateful thanks are due to both of them. K. R. ALUR.

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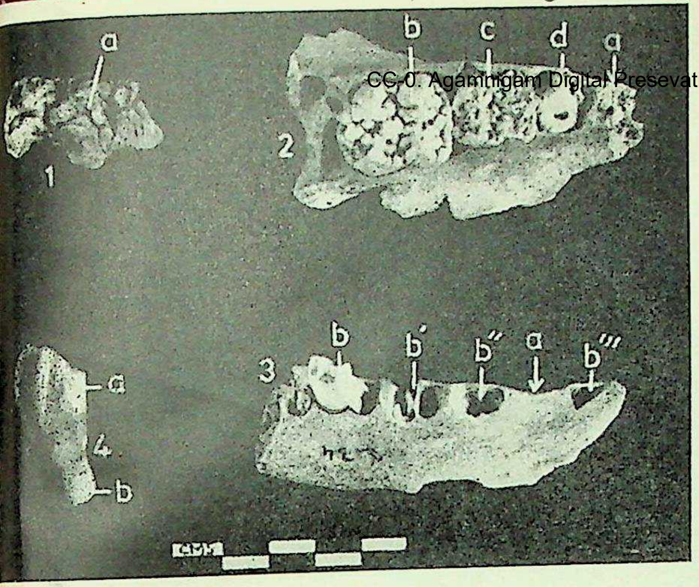
PLATE XV

A. 1). Deciduous molar (swine). 1-a). tuberculate crown. 2). Maxilla (swine). 2-a). unerrupted molar. 2-b). permanent molar. 2-c). deciduous molar. 2-d). broken deciduous molar. 3). Part mandible. 3-a). dental space. 3-b). broken molar. 3-b′ b″). alveoli (molars). 3-b‴). alveolus (canine). 4). A tooth. 4-a). crown. 4-b). root.

B. 1 & 2). Horn cores (cattle). a). tip, b). body and c). base of horn core.

C. 1). Humerus. 1-a). condyle. 2). Femoral head. 2-a). articular area.

D. 1). Patella (cattle). 1–a). base. 1-b). tip. 2). Anchylosed central and IV tarsal (cattle). 2-a). second and third fused tarsal. 2-b). margin of anchylosis. 2-c). central tarsal. 3). Humeral head (fowl). 3-a). pneumatic foramen. 4). Metatarsus (fowl). 4-a). spur process. 4-b). articular condyles. 4-c). tibial end.



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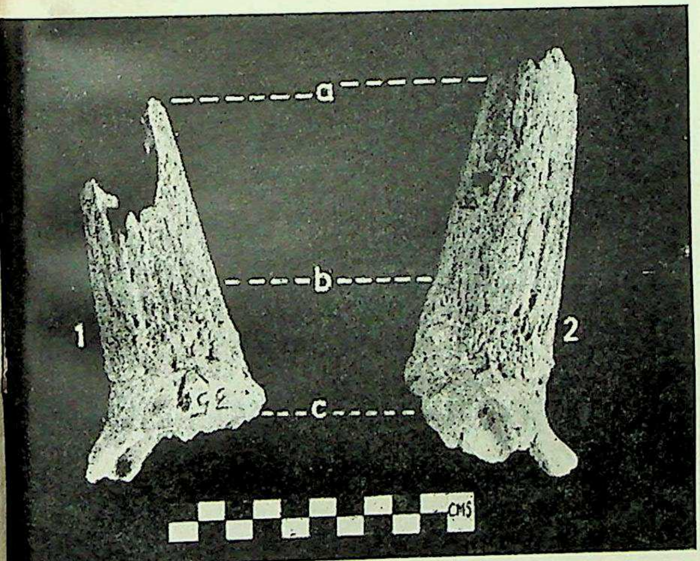

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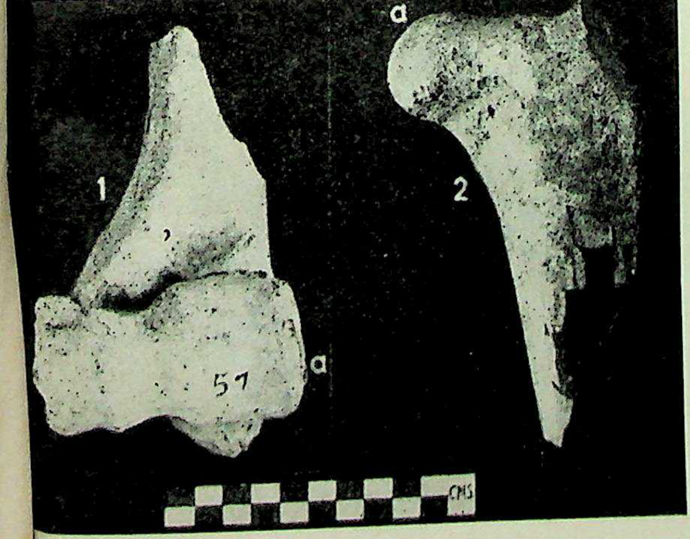

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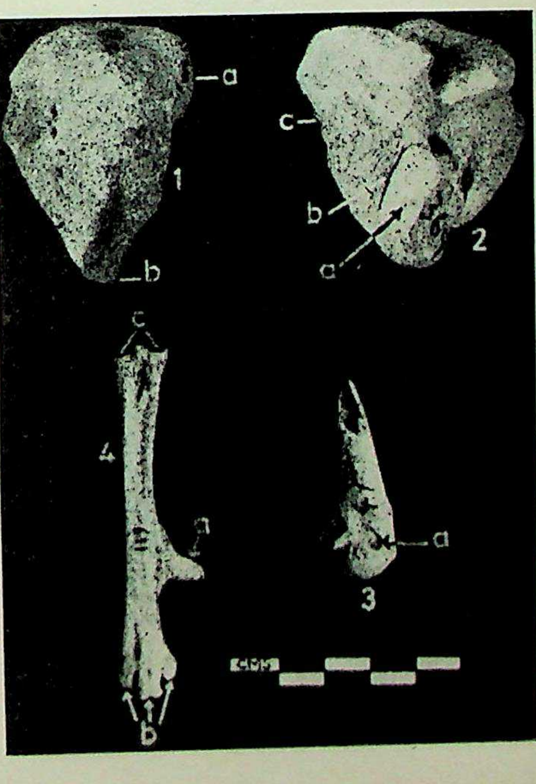

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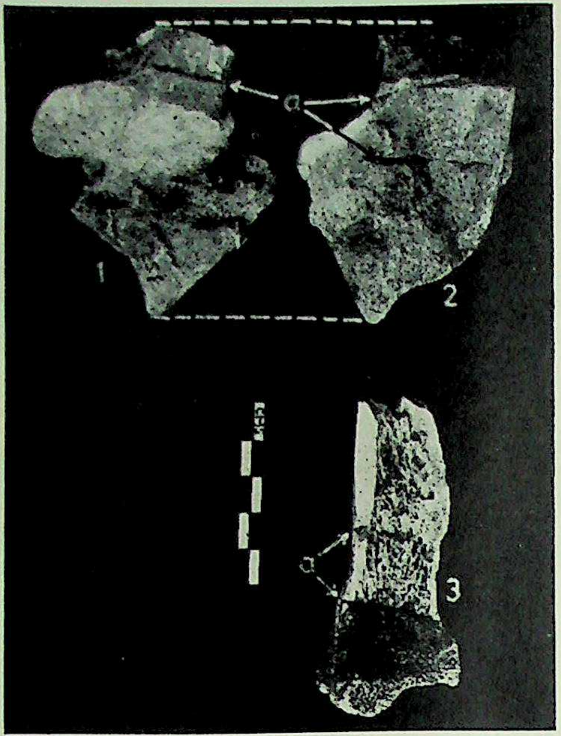
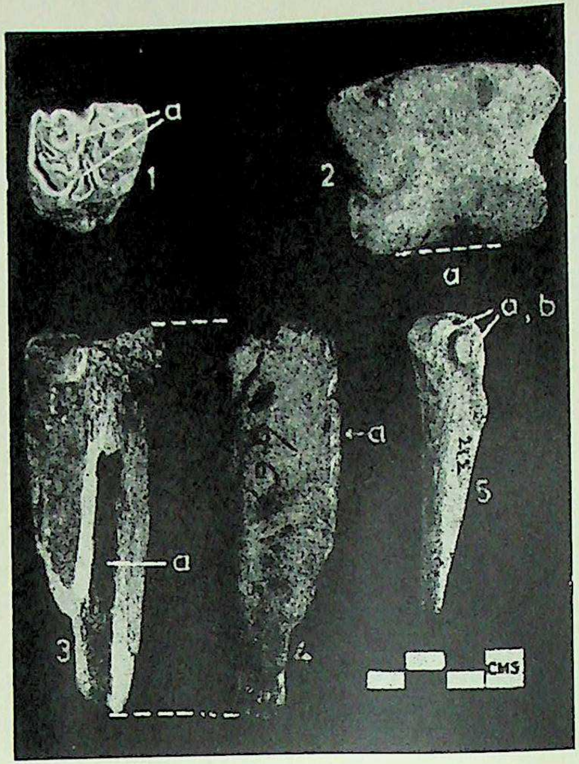
PLATE XVI



A. 1 & 2). Two facets of fibular tarsal, a). chopping marks. 3). A bone segment, a). chopping marks.



B. 1) Molar, 1-a). enamellar folds. 2). Second phalanx, 2-a) articular area. 3 & 4). Two facets of metatarsus, 3-a). medullary cavity. 4-a). part of small metatarsal. 5). Small metacarpal, 5-a & b). articular facets.

PLANT REMAINS

Ancient Plant Economy at Hallur

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INTRODUCTION

Plant remains from Hallur are either carbonised or in the form of incrustations on the rusted arrowheads. Their stratigraphical provenance is shown in Table 1. Four of these samples (Nos. 85, 352, 331 and 463) belong to the Neolithic Age and two of them, the arrowheads (samples Nos. 69 and 108), belong to the early Iron Age. The material was very kindly sent to me for investigation by Dr. M. S. Nagaraja Rao to whom my thanks are due. Dr. Nagaraja Rao also very kindly provided the necessary inforamtion concerning the stratigraphical provenance of these remains. My thanks are also due to Dr. Harbhajan Singh, Head, Division of Plant Introduction, Indian Agricultural Research Institute, New Delhi, who evinced keen interest in the material and took pains in helping me to compare the material with the seeds of the corresponding living species. Facilities provided by the Director, IARI, New Delhi, are also thankfully acknowledged.

Methods

The material in samples 85 and 352 comprises a fragile mass of spikelets somewhat tarred. With great care it was possible to release some spikelets in more or less complete condition to study the shape and the other features in order to establish their identity. Samples Nos. 331 and 463 have fragments of fruits, the internal and external characters of which were helpful in assigning them to *Tectona grandis*. The incrustations on the arrowheads in samples 69 and 108 were partly removed with the help of a needle but being very fragile the spiklets crumbled to pieces. So they were studied as such.

Description of the Plant Remains

A. CEREALS

MILLETS

No. 1. *Eleusine coracana* Gaertn. and *Eleusine indica* Geartn. (Samples Nos. 85 and 353)

A closer examination of the charred mass revealed the presence of a single grain inside each spikelet, which was so loosely placed that it would come off the spikelet after breaking a little of the mass. The spikelet did have a chess-board pattern but the upper surface of the grain and the inner surface of the spikelet was plain with faint and wavy vertical lines. In shape the grains are oblong or globose with both the sides convex, though sunken or shrunk in some. On one end of the grain the hilum scar is very conspicuously clear. The grains look more like extremely small ones of wheat but devoid of the vertical depression or furrow so conspicuous in the seeds of wheat, barley, etc. The dimensions of both the kinds of grains are given in Table 2. In a small number of them released from the charred mass the oblong ones outnumbered the globose ones. Owing to the fragile nature of the material, the release of all the grains from the mass was not tried for the only fear of spoiling the material. The exact proportion of the globose and the oblong grains, therefore, remains unestablished.

Finding that the carbonised grains had nothing to compare in size and character with the seeds of wheat, barley or rice, comparisons were made with those of the millets. The seeds in the genus *Panicum* (*Miliaceum, miliare, frumentaceum*) and in *Setaria italica,* being spindle-shaped and biconvex with prominent to less prominent ribs, are very much different from the carbonised grains, which also differ from those of *Pennesetum typhoides* having seeds with one end broader than the other and with an elongated hilum scar. *Paspalum scrobiculatum* has spindle-shaped to rotund concavo-convex or planoconvex seeds. The rotund ones amongst these, however, approach the carbonised ones to some extent but differ in shape and planoconvex nature of the seeds. The grains in *Sorghum* are arger, subrotund and planoconvex. The globose carbonised grains compare in size, shape, position and size of the hilum scar with those of *Eleusine coracana*. The oblong carbonised grains might belong to *E. indica,* a wild species from which, it is believed, the cultivated *Eleusine coracana* has been derived. The seeds of the two species differ in shape only. In other wild species of *Eleusine,* the seeds are somewhat different.

The millet identified as *Ragi, Eleusine coracana,* is the first archaeobotanical record so far known although the other millets are known to have been grown by the prehistoric people. It is all the more important that *Eleusine coracana* has been discovered from the Indian Neolithic thus making it one of the earliest crops cultivated by the Neolithic folk ; the other being rice from Baidipur in Orissa.[1] Perhaps more important than that is the occurrence of two kinds of seeds, the oblong and the globose, in the same collection which compare with those of the wild and cultivated forms of *Eleusine indica* and *Eleusine coracana.* It is, however, difficult to determine whether the mixture of two types of grains in the same sample is derived from two species or from a hybrid one. The domestication of wild plants and animals is dated from the Neolithic period and since the material happens to be of this period, two possibilities seem to suggest : one, that both the domesticated and the wild species grew together and second, that the early domesticated forms were hybrids. It is, however, not known if a hybrid between the two species (*coracana* and *indica*) will really produce two kinds of seeds. The first possibility seems to be more reasonable. The collection of seeds from a field containing both the species will obviously bring in the seeds of both kinds. No seeds of weeds, however, associated with *Ragi* have been found in the material which one may have expected in a collection of seeds from a mixed cultivation.

No. 2. ? *Paspalum scrobiculatum,* Linn. (Sample No. 69, 108)

Majority of the other spikelets has a tough dark brown shiny outer coat with granulate surface. In some it is covered over by a thin papery membrane. Wherever it has been possible to measure these spikelets seem to be about 1 × 1.5–2 mm. in size and split off into semicircular concavo-convex fragments. No hilum scar or furrow has been observed because complete specimens could not be removed from the mass. These probably belong to some millet. Their ovoid

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[1] Material discovered by Shri B. K. Thapar of Archaeological Survey is being investigated by me.

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shape precludes the possibility of their belonging to species of *Panicum* and *Setaria*. Being broader at one end than the other, they seem to approach *Pennesetum typhoides*. But since the hilum scar has not been seen, it is not possible to refer them to this millet. They, however, look more like the rotund spikelets of *Paspalum scrobiculatum* which too have a rough surface with a tough dark brown membrane and are enclosed in thin papery membranes. Like them the spikelets also appear to be concavo-convex. In all probability they seem to belong to *Paspalum scrobiculatum,* although their reference to this species shall remain tentative until complete spikelets have been examined.

Rice

No. 3. *Oryza sativa* L. (Sample No. 108)

The arrowheads in samples No. 69 and 108 bearing incrustations of plant remains revealed on superficial examination to be made up of spikelets. Most of them are stuck vertically with only the part of the cavities exposed. In the obliquely placed ones the kernel is partly seen. The incrustation from one of the arrowheads was removed with a needle, the fragile, fragmentary masses in which it came off did not reveal any better than on the arrowhead. In one of the arrowheads three spikelets were noted horizontally sticking measuring 7–8 mm. × 2 to 2.5 mm. The chess board pattern of the spikelets can be made out in several fragments and in the complete ones. The incrustation, therefore, seems to be made up of spikelets of rice of the long-grained variety.

B. *Fruits*

Tectona grandis Linn. f. (Samples Nos. 331, 463)

Samples No. 463 and 331 contain fragments of fruits, some of which measure about 1.3 cm. in diameter. Each fragment is made up of bony endocarp with one or two vertical cavities. In some of the fragments a thick fragile mass is sticking to the endocarp making a thick layer. This mass is about 2–3 mm. thick. In irregularly and transversely broken fragments, the cavities seem to be four in number. Each cavity measures about 5–6 mm. × 3–5 mm. It is broader in the centre and narrowing towards the extremities. In the mass of fragments nothing like a complete seed was found, although quite a few fragments probably of seeds were recognised.

The examination of the vertical and transverse fragments revealed that they belonged to drupaceous fruits with four cells and bony endocarp and must have been about 1.5 to 2 cm. in diameter covered with thick soft woolly matter. Examining drupaceous fruits of the same size and characters, the fruits of teak seemed to approach the reconstructed carbonised fruits. On breaking open the fruits they showed similar cavities and the stony endocarp covered with a soft layer. The outline and the dimensions of the cavities in carbonised fragments are so much similar to that of the living teak fruits that a modern seed of teak when placed in one of the cavities would fill it as if it belonged to it. That the carbonised fragments belonged to teak fruits seems to have been established beyond doubt.

DISCUSSION

Plant remains discovered at Hallur belong to the Neolithic and the Iron Ages.

The Neolithic plant remains are of particular interest since hitherto practically no information has been known about them. Recently rice has been discovered from Baidipur in Orissa and *Dolochos biflorus* from Tekkalakota[1] in the Mysore State. Hallur material brings to light the cultivation of millet, a new addition to the archaeobotanical record from Neolithic India. Very likely the cultivated and wild species were both present in the fields indicating that the domestication of wild species, *Eleusine indica,* had already been undertaken by the Neolithic folk at Hallur. It is not possible to say if the mixed cultivation of the wild and cultivated forms of *Eleusine* did suggest an advanced phase of domestication. *Ragi* is cultivated today in dry and hilly parts of most districts in South India and is an important source of food for the poorer classes. Its culms and seeds are used as fodder for cattle.

The discovery of fruits of teak, *Tectona grandis,* at Hallur is yet another interesting record from this region where teak is present only in the adjacent regions. Teak usually occurs in dry climate subject to great heat and draught but also in fairly moist and warm climate and in regions of high rainfall upto 200″ as along the West Coast. It inhabits hilly and undulating country and on granite but sandy and gravelly soil is most unfavourable for its growth. The meagre evidence, however, suggests the occurrence of teak woods and the prevalence of a climate not so dry as to-day. The present-day dry savannah in this region may be due to a change in climate from moist to dry resulting into disintegration of granite into sandy soil and due to the destruction of teak woods by lopping, burning and grazing during the Neolithic. Boles of teak are very useful as poles and a similar use of them might have been made by the Neolithic folk.

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[1] Both under investigation by me.

Rice has been known as an important crop in ancient India from various periods and its discovery from the Iron Age levels at Hallur adds to scores of others known from this Age. The occurrence of Iron Age millet is indeed interesting and is not only a new record for this period but also reveals the continuation of millet cultivation from the Neolithic to Iron Age. Since the identification of Iron Age millet to *Paspalum scrobiculatum* is tentative, nothing much can be said about it. Should its identity be proven to be this millet, it will definitely add to the records of millets known from ancient India.

* * * *

Note : During a seminar on 'The Origins of Agriculture in India and Pakistan', under the auspices of the South Asian Studies, Cambridge University, the archaeological evidence in India and Pakistan was presented by Dr. F. R. Allchin. The remains of cultivated plants from Hallur evoked great interest. Sir Joseph B. Hutchinson, School of Agriculture, with whom I discussed the Hallur finds, made the following observations. I record here the extracts from his correspondence for the benefit of research workers (M. S. Nagaraja Rao).

"Although the record of *Eleusine coracana* is clear, the proportion of *Eleusine indica* grains to *E. coracana* is not known. This is important because *E. indica* is diploid species and *E. coracana,* the cultivated ragi, is tetraploid. There was, therefore, unlikely to be any crossing between them and the *E. indica.* This is the situation upto the present day. There are wild forms of *Coracana* in Africa and some work has been done on the derivation of the cultivated from the wild in Africa.

"The situation was first clarified by Kennedy O'Byrne, who recognised a new species which he named *Eleusine africana* and which is a tetraploid like

Eleusine coracana. *Eleusine africana* is widely distributed as a weed of *Eleusine coracana* in African cultivations of finger millet. Kennedy O'Byrne reported that intermediates are to be found between *Eleusine africana* and *Eleusine coracana* and Mehra described in detail a range of types from a single field in Uganda which covered the variation between the two species. I am not clear from the literature that I have been able to see, whether *Eleusine indica,* the diploid species, occurs in Africa at all. It is clear that most of what is to be found in Africa is *Eleusine africana* and that the origin of *Eleusine coracana,* the cultivated finger millet, is by selection from *Eleusine africana* and the wild species and the cultivated species exist side by side, the one as a weed of the other and still continue to hybridise and to develop intermediate material between them. I can find no record of the occurrence of *Eleusine africana* or of its derivatives by hybridisation with finger millet outside Africa. It appears, therefore, that *Eleusine coracana* was established in India as a pure type and was thereby liberated from competition with its own weedy ancestor. This is parallel to the situation in *Sorghum* (Jowar) where there is in Africa, a group of wild species which behave as weeds and which cross with the cultivated species. These are not present in India where Jowar exists without its weedy ancestral competitor.

"We have enough information already, however, making quite clear that *Eleusine coracana* came from Africa and that *Eleusine indica,* though it occurs as a weed in the cultivated species in India, is not a direct ancestor though it seems very probable that it was ancestrally involved in the origin of the tetraploid *Eleusine africana*.

"Turning now to the other millet, I see that there is some uncertainty as to whether this is *Pennisetum typhoides* or *Paspalum scrobiculatum*. We shall have to reserve judgment on this specimen until it can be examined sufficiently clearly to make sure that it has not got the hilum scar characteristic of *Pennisetum*. This becomes particularly important in view of the fact that *Pennisetum* and *Eleusine* are both of African origin and it is interesting to know, and probably of some cultural significance, whether they were introduced together or separately over a period of time." — J.B.H.

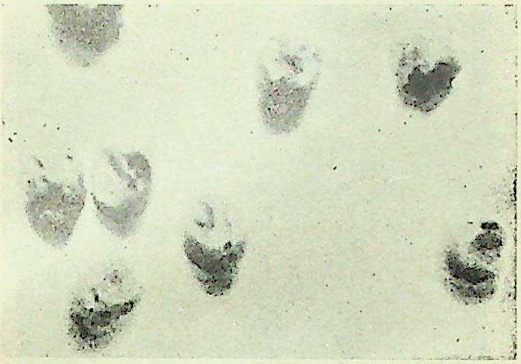
CAB. Pl. Br. Abst., Vol. **27**, No. 4047	J. Kennedy O'Byrne (1957), *Kew Bull.*, 1957, p. 65. Description of *E. africana* which is a wild tetraploid, and discussion of origin of finger millet either from *E. africana,* with which it forms a range of intermediates or from *E. indica.*
CAB, Pl. Br. Abst., Vol. **34**, No. 515	K. L. Mehra (1962), *J. Ind. Bot. Soc.,* **41**, 531. Study of 35 herbarium specimens of African *Eleusine.* Concluded there is *E. coracana* and *E. africana.*
CAB, Pk. Bl. Abst., Vol. **35**, No. 494	K. L. Mehra (1963), *Phycon* **20**, 189. proposed that *E. africana* arose by crossing *E. indica* × "related taxon" and doubling. African highland *coracana* then derived by selection, and Afro-Asiatic *coracana* from the former by selection for reduced glume length.
CAB, Pl. Br. Abst., Vol. **36**, No. 2105	K. L. Mehra (1963), *Curr. Sci.*, **32**, 300. African origin of *E. coracana* "transported to India in pre-Aryan times".

TABLE 1

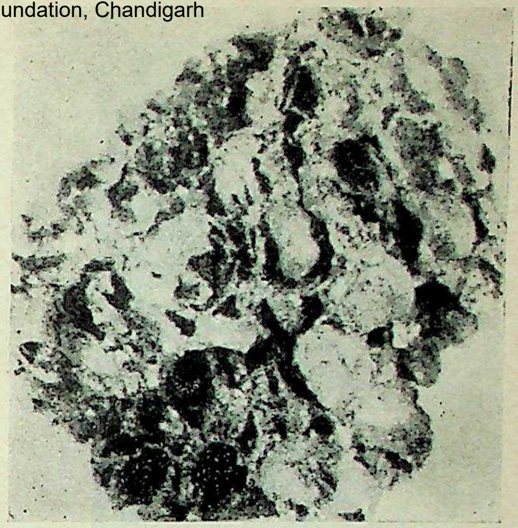
Stratigraphical Provenance of the Plant Remains identified from the Neolithic Site Hallur

S. No.	Rec. No.	Tr. No.	Sub-Sq.	Layer No.	Depth	Remarks	Identification
1.	85	1	2	9	380 cm. B.S.	Collection from floor of the circular House, No. 1	*Eleusine coracana* Gaertn.
2.	353	2	1	7	250 cm. B.S.	—	*Eleusine coracana* Gaertn. and *E. indica* Gaertn.
3.	331	1	1	14	680 cm. B.S.	—	*Tectona grandis* Linn.
4.	463	1	2	10	455 cm. B.S.	Pit E sealed by Layer 10.	*Tectona grandis* Linn.
5.	69	1	2	5	337 cm. B.S.	Arrow head	? *Paspalum scrobiculatum* Linn.
6.	108	1	4	5	325 cm. B.S.	Arrow head	*Oryza sativa* Linn. ? *Paspalum scrobiculatum* Linn.

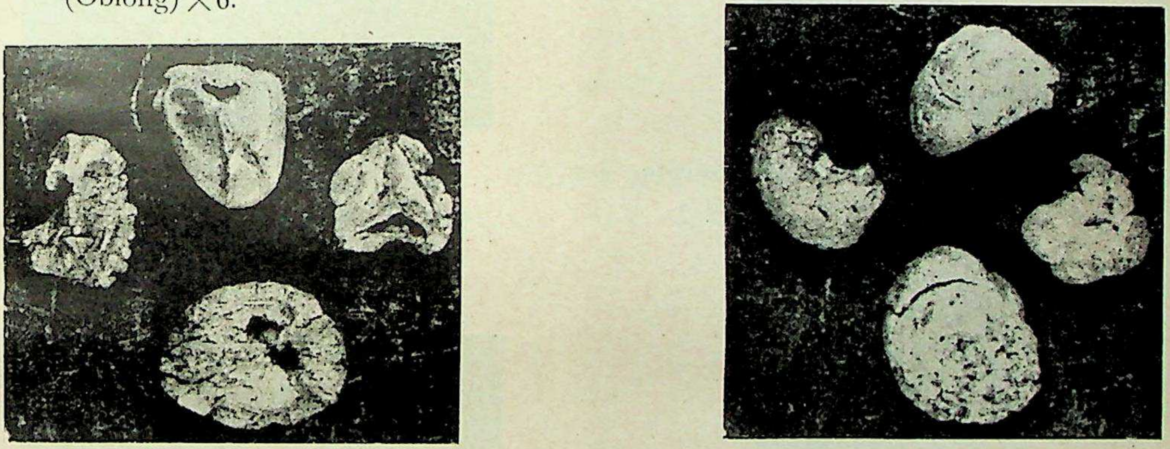
PLATE XVII



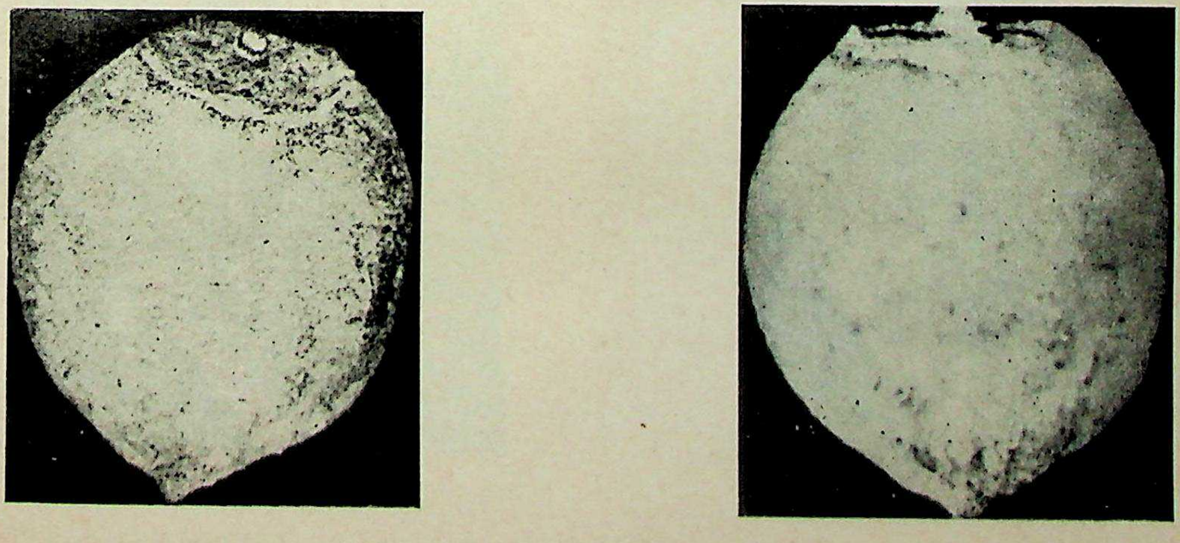
A. Seeds of *Eleusine coracana* Gaertn. (Globose) and *Eleusine indica* Gaertn. (Oblong) ×6.



B. A Tarred Mass of *Eleusine* Spikelets. ×7.

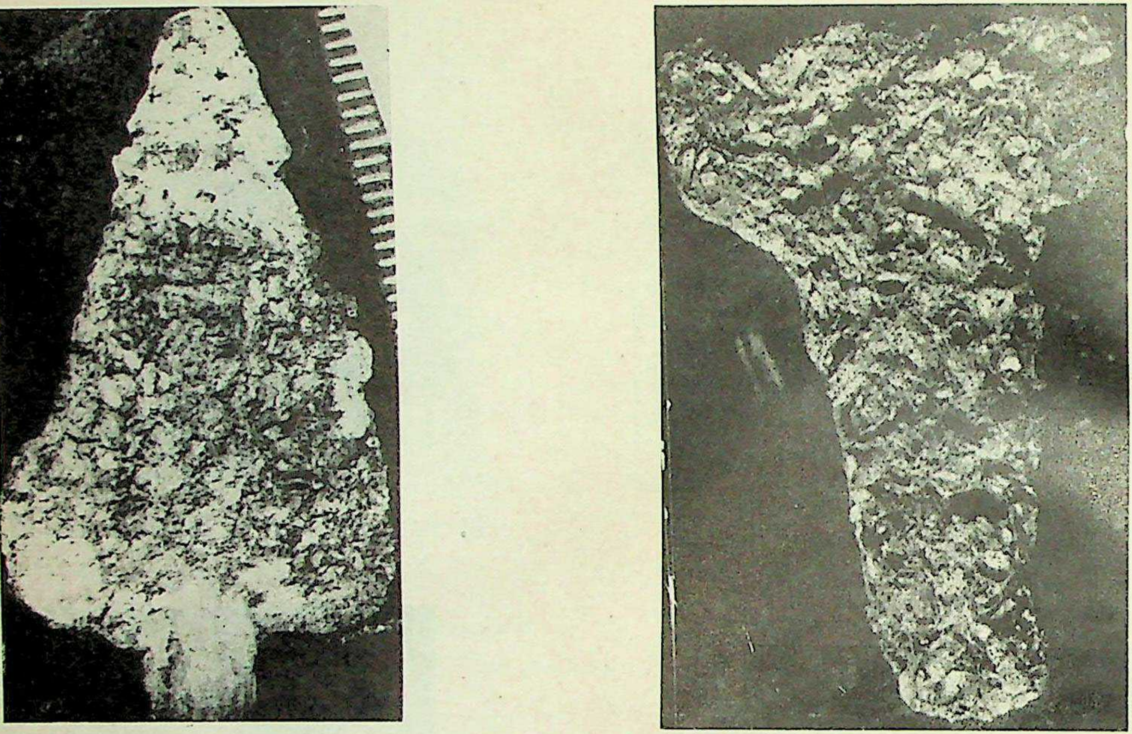


C. & D. Fragments of Fruits of Teak, *Tectona Grandis* Linn. ×2.



E. & F. Modern Fruits of *Tectona Grandis* ×4.

PLATE XVIII

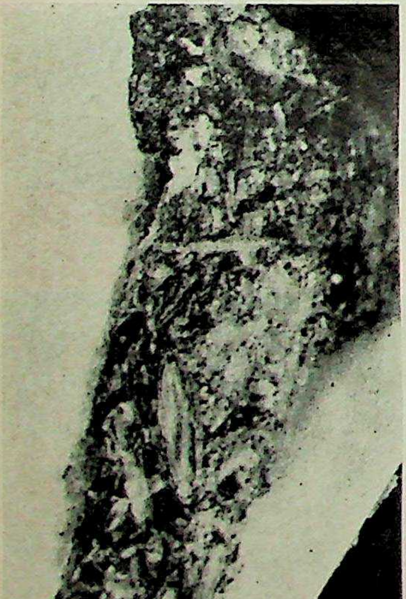


A.

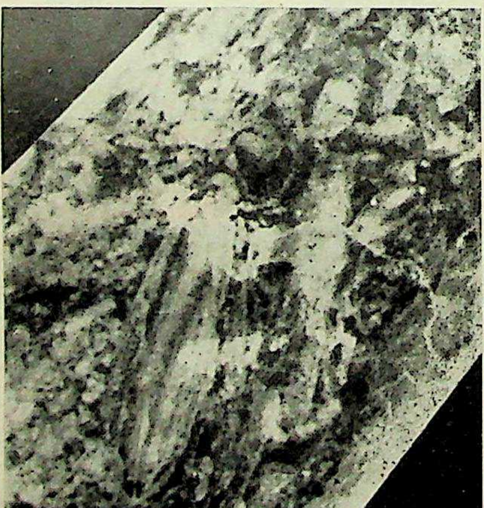
B.

Arrowheads showing spikelets sticking to them.

A ×2, B & C ×2.5



C. ×2.5



D. A part of C enlarged to show spikelets of rice and millet ×6

TABLE 2

Dimensions in mm. of the Carbonised Grains of Eleusine coracana *Gaertn.* (*Ragi*) *and* E. indica *Gaertn.*

Oblong (*E. indica*)		Globose (*E. coracana*)	
Length	Breadth	Length	Breadth
2	1	1	1
2	1	1	1
2	1	1	1
1.75	1	1.25	1.25
1.75	0.75	1.25	1.25
1.50	0.75	1.25	1.25
1.50	0.75	1.50	1.50

RESULTS OF THE EXCAVATIONS

So far the excavations and the antiquities recovered from the cultural deposits of the site have been described. In the following pages, it is proposed to analyse as to how far the excavations have answered the problems with which they were conducted.

The aim of the excavations, as indicated in the beginning of this report, was threefold, viz., (i) a comparative study of the way of life of the river valley inhabitants with that of the hill-dwellers; (ii) the stratigraphic position of the newly found white painted black-and-red ware and its relation to the chalcolithic phase ; and (iii) the chronology of the Megalithic or Iron Age.

Before evaluating the results of the excavations in the light of the above problems, it is necessary to give a sketch of the life of the neolithic-chalcolithic people at Hallur, as revealed from the excavations.

From the present limited evidence of the excavations, it appears that the earliest phase, *i.e.,* Phase 1 of Period I represents an early phase of the neolithic. It is distinguished by a predominantly hand-made grey ware—pale grey and burnished black, often with ochre painting, and a less common but distinctive red burnished ware with purple paintings. Polished stone tools are rare, and even the few found are merely edge ground, tabular blocks of the locally available schist stone. No structural remains and floors are encountered. The animal remains show the existence of domesticated cattle, sheep and goats. There is a rudimentary stone flake industry represented by an insignificant quantity of quartz flakes. But the significant features which distinguish this early phase are the conspicuous absence of typical chalcolithic blade industry, indicating no contact as yet with the chalcolithic folk of the northern Deccan, and any evidence of metal.[1]

Phase 2 of Period I presents a better picture. The structures of this phase are circular with rammed floors, and provided with hearths or fireplaces (Pl. IIIA, Fig. 7). Whenever the floor was uneven, the inhabitants have brought fine river sand, spread it on the floor and made a well rammed, levelled floor (Pl. IIIB). The floors were made of a bedding of chips of the locally available schist and plastered. They were often raised several times (Fig. 6, Layer 10). The structures seem to have been enclosed by a wall, probably of thatched bamboo,, plastered with mud. This wall was supported by posts of bamboo at intervals as the post-holes have yielded remains of bamboo.

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[1] The observation, based on the corroborating evidence of the two excavated trenches, is tentative and is to be confirmed or revised, if large scale excavations demand it.

The pottery as at other neolithic sites, is generally handmade, with a few exceptions of painted pottery which appears to have been brought by a new wave of people from northern Deccan. The vessels include globular pots, bowls, etc., which were meant for ordinary domestic use. But large jars and urns were also utilised for burial purposes as seen from the burials (Pl. IVA & B ; VB). The pottery fabrics show a striking similarity with the wares and the shapes of the neolithic ceramics of T. Narsipur.

The inhabitants seem to have been largely non-vegetarians and consumed the flesh of cattle, deer and molluscs. Many charred bones indicate that the flesh was roasted and consumed (Alur, *supra* p. 123). But the charred grains recovered from the floor of the house No. 1 and identified as *ragi, Eleusine coracana* (Vishnu Mittre, *supra* p. 126), prove beyond doubt that this cereal was not only cultivated but formed part of the diet of the folk. It is interesting in this context to note that even today *ragi* forms the main diet of the farmer class of the old Mysore region and further south. This is the earliest archaeological record of this millet being dated to circa B.C. 1600. It is also one of the earliest crops cultivated by the neolithic people ; the other being rice from Baidipur, Orissa referred to by Dr. Vishnu Mittre (*supra* p. 127). We already know that the pulse, *huruli, Dolichos biflorus* (Sankalia, 1964a, p. 135), and the cereal, wheat (*IAR*, 1964-65, p. I.49, cyclostyled copy) were cultivated and used by the proto-historic inhabitants of Tekkalakota in North Karnataka and Sonegaon in Maharashtra. *Ragi* from Hallur adds to the list of these grains.

It is also interesting to find that *Eleusine coracana* is originally an African millet and that it was "transported to India in pre-Aryan times" (Mehra, 1963, p. 300).[1] It will be more interesting to enquire whether this millet reached the Indian peninsula by land or by some other route, perhaps sea, particularly in the light of the evidence of the head-rests referred to above (*supra* pp. 97-99) which suggest probable contacts with Egypt (Nagaraja Rao, M. S., 1970, pp. 141-148).

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[1] Grateful thanks are due to Sir Joseph B. Hutchinson, School of Agriculture, Cambridge University, for the reference and discussion.

Polished stone tools were mainly used for cutting and splitting wood or bone (Pl. XV. E). They were highly ground and polished and appear to have been manufactured elsewhere. Trap dykes which occur a little away upstream of the Tungabhadra may possibly have been the source of raw material.

The other major stone industry is that of the blade tools, which seem to have been introduced by the new wave of people who arrived at the site, around B.C. 1500. A number of cores and flakes found indicate that the tools are of local manufacture and the material, black-quartzite, is probably derived from the auriferous tract of the famous Honnali schist belt. The other tools put to use by the people are bone points, copper implements such as miniature axes and fish hooks.

Domestication of animals and cultivation are the main occupation of the inhabitants discernible from the evidence of the skeletal remains of the animals and the availability of cereals respectively from the site. The impression of a reed mat at the base of a jar (Pl. VIA) and a copper fish hook attest to the fact that the people were engaged in mat-weaving and fishing.

Among the animals domesticated, cattle seems to be predominant, as the bones indicate. The other animals represented are swine, either domesticated or wild, sheep and goats, antelopes and carnivorous animals (dogs). It is interesting that horse *Equus cabalus,* gets associated with the chalcolithic phase of occupation dated to circa B.C. 1300 (Alur, *supra* p. 123). This is corroborated by the evidence at Sanganakal where Prof. Alur (1969) has identified equine teeth from the deposits ascribed to circa B.C. 1500. The archaeological evidences such as pottery, blade industry and burial customs from these and many other excavated sites in Karnataka and the Deccan have shown that during this period there were cultural contacts between these neolithic communities and the chalcolithic people of the northern Deccan (Nagaraja Rao, 1966) and that there were movements of people from north to south. The evidence of the presence of horse in this context is significant and may indicate the appearance of horse in the subcontinent with the arrival of Indo-Iranian speaking peoples (Allchin, 1968, p. 327, and 1969a) or Aryans (Sankalia, 1967, p. 106).

The beads of steatite, terracotta, stone, bone and shell show the skill of the folk in the lapidary art and their love to bedeck themselves with ornaments.

The burials, though only a few, prove clearly the belief of the people in the life after death. The three burials described above (*supra* pp. 29-30) belong to phase 2. They show that urn burials were common and that children were buried in urns placed mouth-to-mouth in the habitation, sometimes even under the floor of the house itself—a feature noticed in many sites of the Deccan. The child burial No. 1 was provided with three small vessels for use in the life after death.

In about B.C. 1000, another new wave of people arrived at the site with the knowledge of iron and their typical black-and-red ware pottery and mode of burials. However, enough evidence is not available to reconstruct the life of these iron using or megalithic people, as the newcomers are designated. But the following observations may be made.

The principal pottery of the age is the highly burnished wheel made black-and-red ware which was also decorated with a post-firing white painting. Their tools were of iron and mainly consisted of arrowheads, spearheads and knives. The husks of grains, identified as rice, *Oryza sativa* Linn., encrusted on the iron implements, provide a clue to their food habits. It also indicates that rice was cultivated then. Incidentally, this is the earliest evidence of rice in Karnataka.

The Iron Age people buried their dead away from their habitation generally on the slopes of hilly tract to which they seem to have had a special fascination. This may also be due to the fact that they could easily avail of the huge boulders on the hills which they required for their peculiar burial structures. These burials are of several kinds and are generally found in large numbers. But the examples noticed around Hallur are dolmenoid cists and cairns found about 3 miles north at the foot of the hills of Bhairavanapada and 2 miles west of Hallur respectively.

The influence of the newcomers on the already existing inhabitants is clearly seen. The latter seem to have acquiesced to the new elements. This is

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indicated by the almost disappearance of the lithic blade tools and the lessening of polished axes which is, in all probability, due to the advent of iron.[1]

With this brief sketch of the life at Hallur, in the 2nd millennium B.C., we shall now turn to the main aims of the excavation.

At the outset, it becomes clear that the neolithic people occupied not only the 'made grounds' on the castellated granite hills, but also inhabited the river banks. This is further corroborated by the excavated site of T. Narsipur, further south on the bank of Kaveri in Mysore district (*IAR,* 1959-60; 1961-62). But the neolithic people of the granitoid region, particularly Raichur-Bellary area, certainly took advantage of the facilities available on the castellated hills, rather even had a preference to them, and lived on them.

A comparison of the cultural traits sketched above with those of the hill-dwelling folk detailed elsewhere (Nagaraja Rao and Malhotra, 1965, pp. 90–94) would show that they are all common and not much different .Therefore, it is now clear that the people belong to the same cultural group, whether they lived on the 'made grounds' on the hills or on the river banks.

The second problem was that of the stratigraphic position of the white painted black-and-red ware. The excavations have proved for the first time that this ware, in this region, belongs to early Iron Age as already explained (*supra* p. 58). But white painted black-and-red ware of comparable fabric has been found at the chalcolithic sites of Bahal–Tekwada (*IAR,* 1956-57, pp. 18–19) and Tekkalakota (Nagaraja Rao & Malhotra, 1965, pp. 51-54) exclusively associated with burials. A suggestion has already been made that this ware was probably an imported one as far as the chalcolithic sites of the Deccan is concerned (Nagaraja Rao & Malhotra, 1965, p. 51).

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[1] Even with regard to the burial customs, this seems to hold good. Recently my friend, Shri A. Sundara, Research Scholar, Deccan College, Poona, excavated a megalithic site and a neolithic-chalcolithic habitation, near Terdal-Halingali in Jamkhandi taluka of Bijapur district. In one of the cairns on the hill, he found a neolithic burial, consisting of fragments of skull and long bones, placed in their proper anatomical positions, and accompanied by burnished grey vessels, two lunates of chert and chalcedony and a copper bangle, as burial appendage. (Sundara, A., pp. 23-34 1970a). He also recovered a few sherds of black-and-red ware from the burial pit as well as from the cairn heap. About 2 km. from the hill, the excavated L-shaped trench yielded unmistakable evidence of the neolithic-chalcolithic cultural phase. Radio-carbon determinations for the earliest layer show that the site was occupied as early as 1770 B.C. But on the basis of Hallur evidence, the overlap period may tentatively be ascribed to circa B.C. 1000—900. This further indicates the influence of megalithic elements upon the existing neolithic folk. Information by personal communication and mentioned with the kind permission and grateful thanks of Shri A. Sundara—M. S. N.

From the evidence at Hallur, this suggestion gains ground and indicates that the neolithic-chalcolithic folk might have borrowed this from the early Iron Age people, with whom they came into contact in about B.C. 1000, as the radio-carbon dates at Hallur show. The northern extension of this early Iron Age culture is indicated by the pit burial at Ranjala in Khandesh of Maharashtra (*IAR*, 1960-61, p. 26 & Pl. XXXIII B). However, this suggestion requires to be substantiated by more work in the regions concerned.

Finally, the chronology of the introduction of iron into the peninsula. Until recently the iron implements found in the megalithic tombs in south India were considered to be the earliest evidence of iron in India, even though the megalithic tombs were ascribed only to circa B.C. 300 (Wheeler, 1959, p. 163). In fact Gordon, writing in 1950, declared that apart from the evidence in the megalithic burials and cairns of Baluchistan, there was no evidence of the use of iron by any one in India or Pakistan prior to 250 B.C. (Gordon, 1950, p. 67). Wheeler, however, has recently revised his opinion and has postulated that the Achaemenid Persians introduced the use of iron into northern India at the end of the 6th century B.C. and the iron works of the megalithic builders are derived from the north (Wheeler, 1959, p. 24). On the contrary, recent discoveries in the north have shown that the use of iron was known much earlier. Iron has been associated with the users of the painted grey ware, as known from the sites of Hastinapura, Alamgirpur, Kausambi and Ujjain. Examining all the then available evidence Banerjee dated the early occurrence of iron to about 800 B.C. (Banerjee, 1965, p. 224). But a radio-carbon date for an early level of Atranjikhera II, has necessitated a revision of this dating. The date is circa 1025 ± 110 B.C. (TF. 191, 2975 ± 110), and therefore, the dates for earlier deposits may recede further. Therefore, the early introduction of iron in the north can safely be ascribed to circa B.C. 1000.

In the peninsular India, early Iron Age has generally been found to overlap with the neolithic-chalcolithic, and Dr. Banerjee has dated the beginnings of the early Iron Age to circa 700 B.C. and postulated that 'The Iron Age in India was ushered into south India later than in the Ganga plains' (Banerjee, 1965, pp. 225 and 239). This will have to be reconsidered in the light of the radio-carbon determinations for the overlap phase at Hallur. The available dates (*supra* pp. 14-15) indicate that in about B.C. 1030 ± 105, a new wave of people arrived at the site, with the knowledge of iron, and a white painted black-and-red ware as their main ceramic. They settled at the site and co-existed with the local neolithic-chalcolithic inhabitants. This suggests that introduction of iron into south India had already taken place in the beginning of the first millennium B.C. This rules out the possibility of iron being 'ushered into south India later than in the Ganga plains'. Although the white painted black-and-red ware and remains of horse are pointers to the direction from which the iron-using people arrived into south India, we will have to await further excavations with a series of radio-carbon dates for Iron Age deposits in the northern Deccan for conclusive evidence.

RESUME

The vertical excavation of two trenches, on the ancient mound, on the left bank of the Tungabhadra river has revealed that the site was occupied during the neolithic and early Iron Age period between circa 1800–1000 B.C. Antiquities from the disturbed upper strata of the mound indicate the continuity of occupation during the early historic period.

The beginnings of the neolithic culture in Karnataka has been dated to circa B.C. 2300,[1] and of this culture, Allchin has distinguished three phases (Allchin, F. R. & B., 1968, pp. 161-70). There is a suggestion at Hallur that his early phase is represented by the earliest layer. His phases two and three are similar to phases 1 and 2 respectively.

Phase 1 of the neolithic is devoid of structural remains and is noted for the absence of metal and the stone blade industry. The second phase at Hallur shows the arrival of new peoples from northern direction, and clearly indicates contacts with the chalcolithic culture of the Deccan as evidenced by the stone blade industry and the burial methods. The other highlights of this phase are, the discovery of grains identified as ragi, *Eleusine coracana*, which shows that this millet of African origin was cultivated in this part of the subcontinent by the neolithic people ; the identification of equine bones from the final layers of this phase just preceding the early Iron Age suggesting arrival of new people from the northern direction.

Early Iron Age at this site overlaps with the existing neolithic-chalcolithic culture. The radio-carbon dates for samples from this phase show that the iron-using people arrived at the site around B.C. 1000, and co-existed with the neolithic inhabitants. The site has thus provided the earliest date for the introduction of iron into the peninsular India. The use of a fine black-and-red ware, with a white painted decoration, cultivation of rice attested by charred grains and the remains of horse are the other noteworthy features of this period.

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[1] A recent radio-carbon date for the ash mound at Kodekal (Shorapur taluka, Gulbarga district) is 4285 ± 105 (4410 ± 105), i.e., B.C. 2460. This pushes back the date for the beginning of the southern neolithic to circa B.C. 2500. Information communicated by Shri K. Paddayya of Deccan College, Poona, and mentioned with thanks.—M.S.N.

Finally the site has yielded evidence of early historic remains—black-and-red ware, russet-coated painted ware and the red ware—indicating the continuity of occupation during that period.

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